Service
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PLAIN PAPER FAX - SG SERIES

Magic 2 Series - PPF 441,PPF 456,PPF 476,PPF 486

ServiceManual

Plain Paper Fax - Ink film technology

A compact Feature phone, an integrated FAX machine with or without integrated Answering Machine, combined with an Intelligent Fax Switch, e-mail capability, detachable scanner (only PPF456,476,486), all in a Plain Paper Fax Machine. Prepared for Cordless Phone management - DECT Technology, Caller ID (country dependant), Document Memory (only PPF 456,476,486)

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

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1 Introduction

In this chapter you can find

- Safety precautions
- List of features
- Feature description
- Operating elements

1 SAFETY PRECAUTIONS

1.1 IMPORTANT

1. This Fax Model has been specificated as a Class II unit (ungrounded).
   All digital circuitry is connected to the potential of the Telecom line.
   That means: If you want to measure in the unit with connected Telecom line you have to use **ungrounded** measuring instruments. Otherwise it is possible that you shorten the Telecom potential to ground.
2. Service technicians must be made AWARE OF ESD and be GROUNDED!
   To avoid ESD risk you can order some ESD-equipment in the parts list
3. After each disassembly of the apparatus a high voltage test has to be performed.
   (3kV AC between mains and Telecom line)
4. **Attention**: Discard used of Spare Parts not according to manufacturers instructions.

WARNING!

Before opening the machine disconnect the Power Cable.

Never remove the isolationplate from the PGU

- HIGH VOLTAGE! -

1.2 ESD

1.2.1 General

ESD is a spark jumping from one conductive surface, charged with static electricity to another conductive surface. This incredibly fast movement of static discharge (the charge can jump to that conductor in a nanosecond) can have disastrous consequences, especially for electronic circuitry.We only feel ESD at a discharge of about 3.000 Volts.However many semiconductors can be damaged by a discharge of just 60 Volts or less.On non-conducting materials, such as plastics and textiles, charges remain stationary and cannot discharge and are therefore called static charges.
Static charges are brought in by people and are generated during their normal movements.

1.2.2 Precautions to prevent ESD-damage

Static electricity cannot be eliminated but it can be kept under control. Charging can be prevented by an appropriate grounding system for people and objects that may come into contact with the component or product.

TO PREVENT ESD KEEP THE FOLLOWING RULES:

1. All products being brought in for repair must be
   - processed in an ESD protected working area with a Grounded dissipative mat.
   - kept in ESD protective packing material when not used.
2. Technicians should wear a wrist strap ground connected.

FOR MORE INFORMATION ON USER FUNCTIONS, USER MANUALS CAN BE ORDERED IN DIFFERENT LANGUAGES. SEE SPARE PARTS LIST.

2.1 FUNCTIONS

2.1.1 Basic functions

If you want to keep a note of the factory settings on your machine for later, we recommend printing out a function list before you change any of the settings (press MENU three times). If you want to delete your individual settings, you can do so in function 45 "Service code" (see chapter Tipps und Tricks / Service code). "Your name" and "your telephone number" are transmitted at the top of each page (the first 4 mm) together with the date, time and page number.

HELP FUNCTION

1 Press HELP/INSTALL twice. You will receive a printout explaining how to use the most important functions. It also specifies how to obtain further HELP pages concerning other features of your fax machine.

TIME AND DATE

1 Select function 12 by pressing MENU and numbers ① and ②.

2 Press OK.

3 Enter the correct time using the number keys (e. g. ⓪⑨①⑤ for 9:15). Your fax machine will now ask you for the correct date (e. g. ①⑤⓪⑤⓪⓪ for May 15, 2000).

4 Press OK

In case you want to change only part of a setting e. g. the day confirm all the correct entries with OK. A complete re-entry is not necessary.

ENTERING A NUMBER

Use ⑪ or ⑩ to enter the "+", that is often used in international fax numbers in front of the country code, and ► to enter a space. The maximum number of digits you can use for your number is 20.

1 Select function 13.

2 Press OK.

3 Enter your telephone or fax number (Country codes: UK +44, Ireland +353, Hong Kong +852, Singapore +65).

4 Press OK. Your number is now stored.

ENTERING A NAME

1 Select function 14.

2 Press OK.

3 Open the flap on top of the fax machine and enter your name by using the keyboard (see below).

4 Confirm with OK. Your entry is now stored.

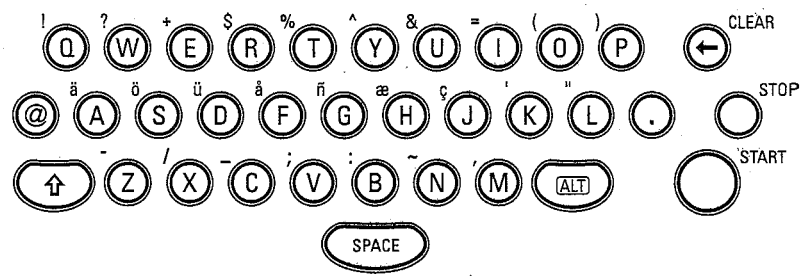
CORRECTION

If you have entered a wrong letter or number in function 13 or 14 you can correct the mistake during the entering as well as later. If you want to make your corrections later you have to select the functions for entering numbers or names once again.

1 Select the character you want to change with ◄/►. Press CLEAR to delete the character. By pressing CLEAR long the whole line will be deleted.

2 Now enter the correct characters by using the keyboard. Confirm with OK.

The easy install function ensures that your fax as well as additional devices will operate correctly in configuration: SERIAL or configuration: PARALLEL.



LANGUAGE OF DISPLAY

1 For selecting the language of the display and the reports, enter function 11 and press OK.

2 Select the desired language with ◄/► and confirm with OK.

TYPE OF RING SIGNAL

You can choose between ten different ring signals. Enter function 44 and press OK. Select the desired ring signal with ⓪ to ⑨. Confirm your setting with OK.

VOLUME OF THE RING SIGNAL

You can adjust the volume of the ring signal if the fax machine is in stand-by mode or if it is just ringing. Please note that different volumes can be set in ☼ and ☾ mode (see Fax switch).
By pressing ◄/► the display shows the current setting for about three seconds. Change the volume by pressing ◄/► until the desired volume is achieved.

VOLUME OF THE LOUDSPEAKER

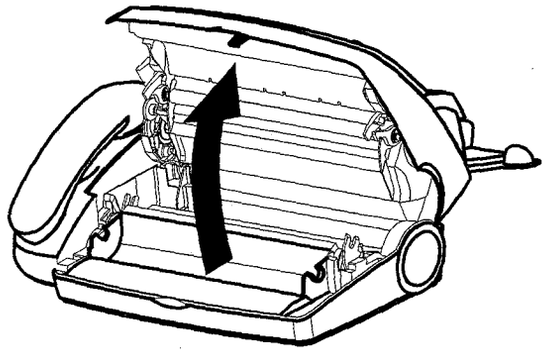
You can adjust the volume of the loudspeaker at any time by pressing DIAL (without built-in answering machine) or ① (with built-in answering machine). By pressing ◄/► the display shows the current setting. If you wish to adjust the displayed value, press ◄/► until the desired volume is achieved. Finish your entry by pressing STOP.

REPLACING THE INK FILM

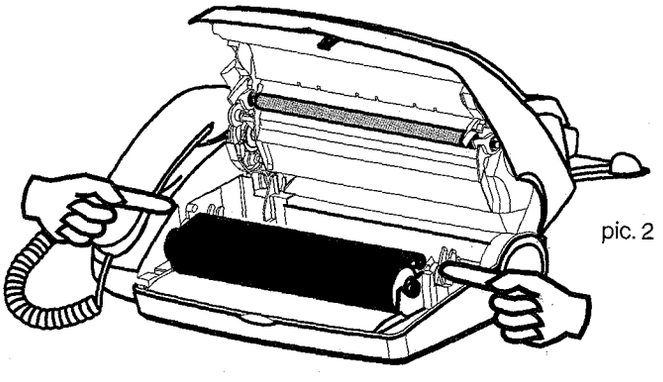
Open the Cover (pic. 1)

1 Lift the rear ink film roll holding both sides with your index fingers upwards, in order to remove it out of its seat and place it next to the front ink film roll. (pic. 2)

pic. 1



2 Remove both ink film rolls. They cannot be reused. Dispose of the ink film rolls with normal waste. Load a new ink film, because your fax machine cannot work correctly without it.
Remark: Inkfilm can be made unreadeable by microwave (~2 minutes)



pic. 2

2.2.2 Basic Operation - E-Mail

FAX TRANSMISSION VIA E-MAIL

Your fax machine allows you to send fax messages as e-mails.

1 Insert document face up in the document feed-slot (max. ten pages).

2 Select function 26. Press OK.

DIAL NUMBER
ENTER ADDRESS

3 Enter the recipients e-mail address using the e-mail keyboard, e. g. frank.burger@fax.com. Use the dial pad in case you want to enter numbers as well.

4 Confirm with OK. The fax will be sent automatically as an attachment to an e-mail.

* EMAIL *

Easy e-mail fax transmission
You can send e-mails without using function 26:

1 Insert the document in the document feed slot, enter the e-mail address and press START.

SMS VIA E-MAIL

In order to send a text message instead of transmitting a document, enter the text using the e-mail keyboard (approx. 255 characters). This function is especially useful for mailing list (un)subscription. This is not a GSM message.

1 Select function 26 and press OK.

ENTER ADDRESS

2 Open the flap. Enter the recipients e-mail address using the e-mail keyboard. Use the dial pad in case you want to enter numbers as well. Press OK.

ENTER TEXT

3 Enter the desired text. Press OK. Your message will be sent.

* EMAIL *

Easy e-mail transmission

You can send e-mails without using function 26:

1 Enter the e-mail address and press START.

2 Enter text using the e-mail keyboard and press START.

DOWNLOAD INTERNET PAGES

In order to download Internet pages, enter the Internet address. The desired Internet page will be sent to your fax machine and printed out. Links to other web pages are only possible by entering the correct site address (e. g. www.philips.com).

1 Select function 27. Press OK.

ENTER ADDRESS

2 Open the flap. Enter the desired Internet site address using the e-mail keyboard. Use the dial pad in case you want to enter numbers as well. Confirm with OK.

* WEB PAGE *

By entering "Index" and pressing **OK**, an overall view of those Internet pages already prepared for your fax machine will be displayed. It is not necessary to be aware of capitalisation when entering Internet or e-mail ad-dresses.

E-MAIL RECEPTION

Incoming e-mails will be printed out like regular fax messages. This also includes documents attached to e-mail messages (attachments). If you do not want your e-mail messages printed out, you can switch off e-mail reception. Your e-mail messages will be stored with your fax server until you retrieve them.

1 Select function 28. Press OK.

RECEIVE MAIL:YES

2 Select desired option with ◄/►. Press OK.

RECEIVE MAIL:NO

Possible mail formats: jpg, bmp, tif, txt, html, gif, pcx, pdf, doc, xls and ppt.
Turning off e-mail reception does not affect fax message print out.
Haben Sie in Funktion 31 und 32 eingestellt, ist automatischer Empfang von E-Mails oder Internetseiten nicht möglich. Wenn Sie den Hörer an Ihrem Faxgerät abheben und einen Pfeifton oder Stille hören, drücken Sie auf START.

2.2.3 Communication

PAGE HEADER

TTI and page number are printed on each fax that will be transmitted. It is possible to turn off the page header.

TRANSMIT TERMINAL IDENTIFICATION (TTI)

Identifies the user's fax unit by including the name and fax number that has been programmed into the fax unit on the top of every page. This allows the receiving parties to easily identify the source of all documents being sent to them. FCC regulations also require that transmitted documents identify the sender's name, phone number, transmission date and time.

TSI / CSI

TSI: Identification (Tel. Nr.) of the transmitting machine
CSI: Identification (Tel. Nr.) of the receiving machine

COMPRESSION METHODS

Modified Hoffman: method to reduce the data transferred via the telephone line.
All G3 machines offer M.H.-coding.

Modified read: efficient coding system that increases speed by about 15%.
M.R. is not available in some G3 machines.

2.2.4 Copy quality

fine: increased vertical resolution from 3,85 to 7,7 lines/mm for transmission of detailed drawings or small characters
photo: resolution mode 64 grey levels for photo.

Save ink film funtion: based on the length of original document.

AUTOMATIC BACKGROUND CONTROL

The background control (=intensity difference between the text and the background) is adjusted automatically.

2.2.5 TAM / DMM features

DIGITAL TAM - solid state Flash Memory - 30 min recording

Messages / Documents (up to 50 pages) can be stored in solid state devices, no tape is used for recording

RECORDING TELEPHONE CONVERSATIONS

You can record a telephone conversation with your fax machine. Press Rec. while talking. (TAM model)

SKIP FORWARD

Move to next message by pressing the Play key ater listening to the new ICM.

REPLAY MESSAGE

Last message is repeated

ERASE ONE MESSAGE

The message you have heard can be deleted after hearing the confirmation tone twice.

ERASE ALL MESSAGES

This function erase all recorded messages

FORWARDING CALLS

Incoming messages are automatically forwarded to a preprogrammed telephone number. You can select the number of messages to be forwarded at the same time. The party to which the calls are being forwarded needs to enter the access code.

TIME DATE STAMP

The fax machine will automatically record the date and time of every recorded message. If you play back a message, you will see data on display.

OGM

There are two outgoing messages available. (TAM can be switch ON / OFF by pressing this key)
OGM1: The caller will be told to leave a message
OGM2: The caller will be informed about the end of the recording

BREAKTHROUGH

During the OGM, a code can be given. This will override the TAM and the machine will ring again.
If you have activated the function you will hear no rings and any incoming call will be answered automatically.
Only callers who dial the breakthrough code (4-digit) can let the fax machine ring.

REMOTE OPERATION

Via DTMF dialing the recorded messages can be played back from any place you want.

Funktion	Key
Stop	0
Play	1
Forward	2
Rewind	3
Delete this only	4
Delete All	5

remark: in some countries the user who makes remote access, has to press any key at least once. Otherwise, the connection will be interrupted. (Line disconnect condition)

Repeat All	(6)
Record OGM	(8)
Switch TAM ON/OFF	(9)

MEMO MODE

Internal memo
You can record a personal message with this function. Your fax machine thus becomes a note pad. Messages can only be heard on the fax machine itself or by remote control from a telephone.

External memo
You can record a message which the caller can hear without being able to leave a message in return. Turn it Off if not in use.

2.2.6 Lists and Reports

TRANSMISSION/ERROR REPORT

Every time you send a document your fax machine prints a transmission report. If an error occurs during transmission you will be informed by the error report, which is printed out.

Examples for transmission - and error report:

TRANSMISSION REPORT 14-OCT-99 9:07

FROM (OWNER):	+43 1 12345
TO :	+43 1 54321
DIALLED NUMBER:	54321
PAGE(S):	1
DURATION :	0' 26''
RESOLUTION:	STANDARD
RESULT:	OK

ERROR REPORT 14-OCT-99 9:07

FROM:	+43 1 12345
TO (OWNER):	+43 1 54321
PAGE(S):	1
DURATION :	0' 48''
RESOLUTION:	STANDARD
ERROR IN PAGE (S):	1

SERVICE REPORT

Listing of occured transmission-errors...

SYSTEM REPORT

Listing of current settings including the BSW- and NCU parameter list

STORED NO. LIST

This function provides you with a list of the short dial and name dial numbers you have stored.

FUNCTION LIST

Listing of all functions including a current settings list. By pressing easy install, funtions can be printed (see user manual).

SRAM(MEMORY)-DATA LIST

Partial selectable listing of SRAM contents: Factory Only

LIU-PARAMETER LIST

Listing of all LIU-OTPROM data

SCANNER REFERENCE LINE - PRINTOUT

The scan. ref. line is a graph of the current CIS-condition

2.2.7 Service feature

BSW-SETTING

Change the Bitswitch settings. Determine some parameters for the telephone interface.

NCU-PARAMETER SETTING

Change the NCU-parameter. Software commands for the machines behavior.

SRAM(MEMORY) DATA SETTING

Change address in the SRAM data. Factory Only

LIU-PARAMETER SETTING

Change the LIU-parameter like ringing values, pulse etc, by the use of right codes. (See page 2-15)

2.2.8 Others

CLOCK SETTING

Set actual date and time for a correct fax header.

LANGUAGE SETTING

You can select the language in which messages are displayed and reports printed out. (Service Reports in English normally)

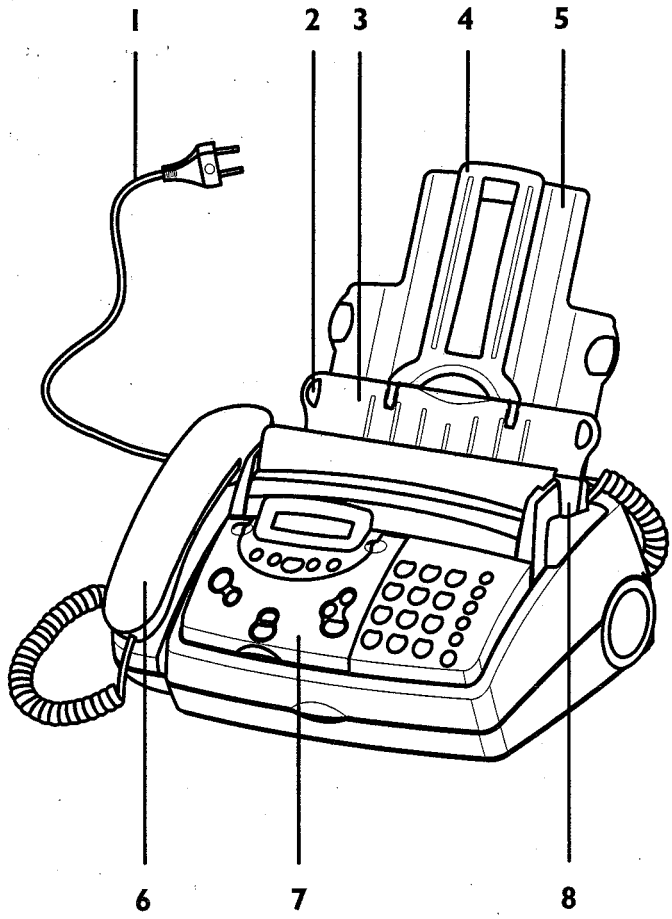
POWER SAVE MODE

The machine is on Power save mode under the Stand by condition, automatically. About 2 W consumption.

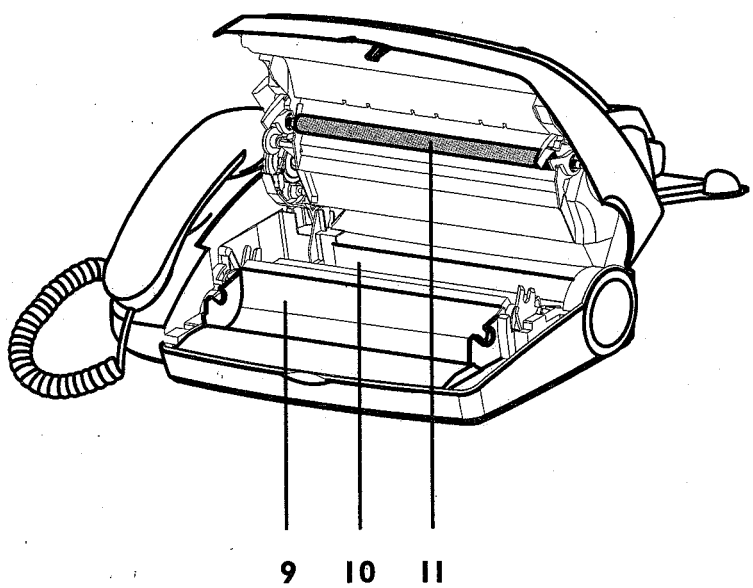
The machine will wake up from power save by following events (no settings necessary):

Key pressed
Ring detected
Document inserted
Handset lifted
External phone detected

3 OPERATION ELEMENTS



1 Mains Cable with Power Plug
2 Document Guide
3 Document Support
4 Paper Feed Flap
5 Paper Tray
6 Telephone Handset
7 Operation Panel
8 Detachable Scanner



9 Front Ink Film compartment
10 Rear Ink Film compartment
11 Grey printer roller

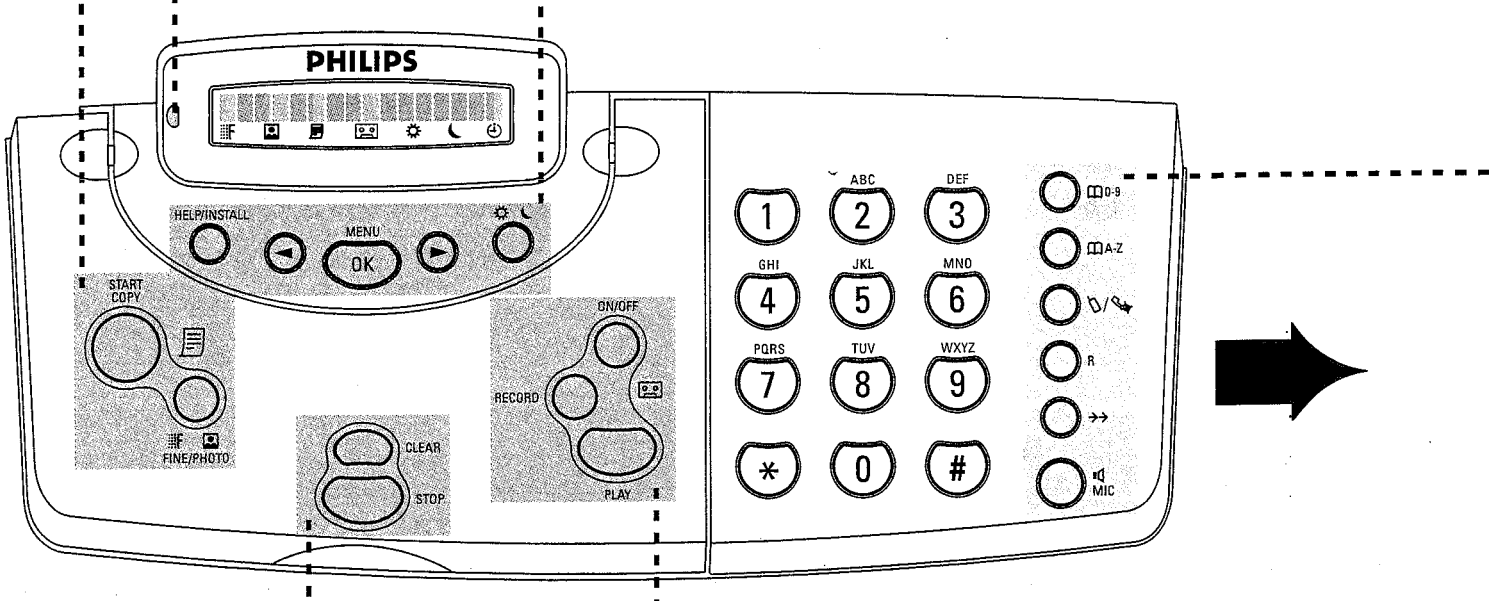
3.1 LOCATION OF CONTROLS

(example from panel PPF 476)

START/COPY
press briefly: to start fax transmission or to copy a document
press and hold (two seconds): multiple copy an inserted document/ rapid call up of faxes
FINE /PHOTO
to select a higher resolution when copying or sending (for text and graphics—FINE; for photographs—

DISPLAY LAMP
If this lamp flashes, please read the message on the display.

HELP/INSTALL
press briefly (twice): print operating instructions for the most important functions with references to additional help pages / press briefly with flap open: print e-mail help page
press and hold (two seconds): to start the automatic installation of your faxmachine / printout of Easy Install
◄
to select options / to adjust the volume / to move cursor to left of display
MENU/OK
for calling up functions / to confirm entries
►
to select options / to adjust the volume / to insert a blank when entering a name / to move cursor to right of display
☼ ☾
to select the different operation modes
press briefly: choose between ☼ and ☾
press and hold (two seconds): operating mode⏻on/off

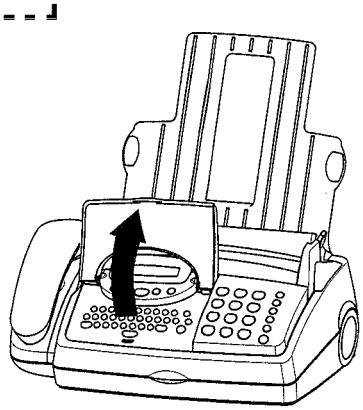


STOP
stops procedures
CLEAR
press briefly: to delete messages / entries / individual symbols
press and hold (two seconds): to cancel the whole entry

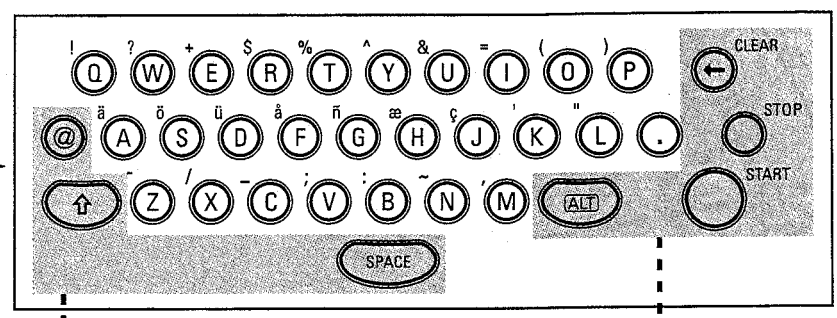
for fax machine with built-in answering device:

ON/OFF
activate / deactivate answering machine
RECORD
press briefly: to play back your outgoing message
press and hold (two seconds): to record a new outgoing message
PLAY
To play back messages. The key flashes when new messages and memos have been recorded. After playback key stays lit until messages are deleted.

0-9
press briefly: to select a phone number quickly
press and hold (two seconds): to store a telephone number
A-Z
press briefly: to call up a name entry
press and hold (two seconds): to store a name entry
/
temporarily muted of microphone during a call / transfering a call from the faxmachine to another telephone (only for serial connection, see Glossary)
R
press briefly: for special functions, e. g. for the use with a private branch exchange and for using various functions provided by your service provider (call waiting etc.)
press and hold: to insert a dial pause between two figures
→→
press briefly: to repeat the last five numbers you have dialled
press and hold (two seconds): to browse the list of callers
DIAL / MIC
for dialling without lifting the handset. Bfor devices with built in answering machine for hands-free operation.



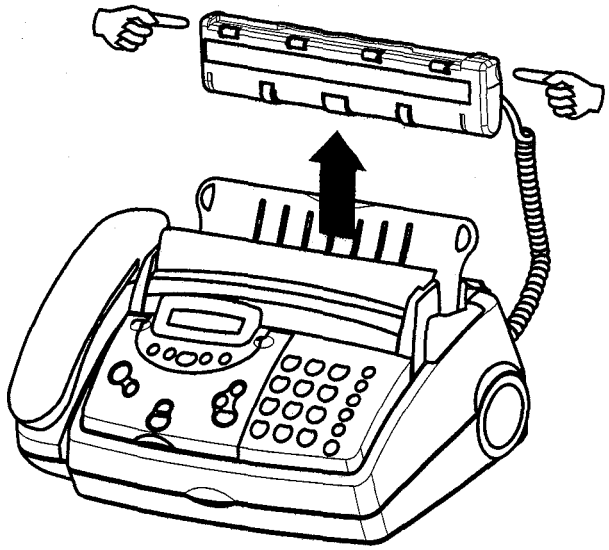
E-mail keypad under the flap:



@
for entering e-mail-addresses
⇧
for shifting to capital letters press ⇧ and desired key simultaneously
SPACE
to insert a space

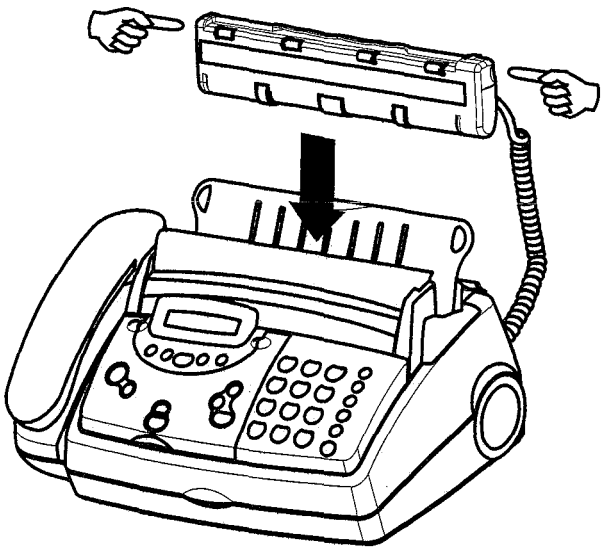
CLEAR
press briefly: to delete messages / entries / indiviual symbols
press and hold (two seconds): to cancel the whole entry
STOP
stops procedures
START
press briefly: to start fax transmission or to copy a document
press and hold (two seconds): multible copying of inserted document /rapid call up of faxes
ALT
for special symbols press ALT-key and desired key simultaneously (e. g. ALT and Z for hyphen)

3.2 DETACHABLE SCANNER



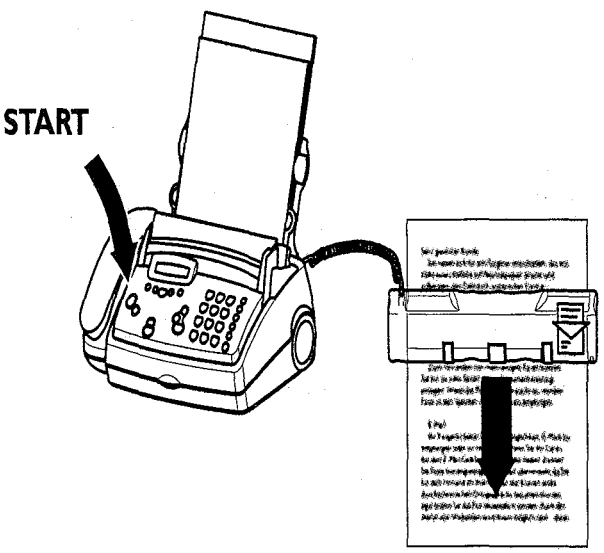
HOW TO DETACH SCANNER

Press carefully towards you and lift gently



SCANNER GOES BACK INTO THE POSITION

Set the scanner back on place until it is secured
Scanner glass towards user



AREA OF SCANNING

Place document to be scanned on a flat area.
Slight the scanner over the document slow and firmly.
Press start and wait for start tone.
High tone means that the scanner moves too fast.
Short tones mean that the speed is correct
NOTE:document must be in contact with scanner at each position !

II Functions

In this chapter you can find

- Print out of the Function List
- User Function (basics)
- Description Service Mode
- Description Service Functions
- Description e-mail Functions

4 GENERAL

4.1 FUNCTION LIST

Enter in Service Mode to print this List. The function list is a summary of all user and service functions and includes additional current settings.The structure of all functions is divided in two sections - User functions / Service functions.

Example for the Function list for the TAM model :

FUNCTION LIST

1 SET UP	2 FAX	3 FAXSWITCH	4 OTHERS	5 ANSWERING DEV.
11 SET LANGUAGE 12 TIME/DATE 13 YOUR TEL. NO. 14 YOUR NAME 15 DIAL MODE 17 NET CONNECTION 18 PRE PAID CARD	21 SLOW (4800) 22 POLLED REC: 23 POLLING SEND 24 SEND LATER 25 BROADCAST 26 E-MAILS 27 INTERNET POLLING 28 E-MAIL RX 29 FAX TO NET	31 DAY 32 NIGHT 33 TIMER 34 EASY LINK	41 FAX JOURNAL 42 DIALLING LIST 43 TRANSM. REPORT 44 RINGER TYPE 45 SERVICECODE 46 REDUCTION 47 CONTRAST	51 RECORD TIME 52 ACCESS CODE 53 VIP-CODE 54 MEMO MODE 55 FORWARDING
6 ADJUSTMENTS	**7 RECONFIGURE**	**8 GENERAL TESTS**	**9 TEL. UNIT**	
61 MODEM TEST 62 DTFM TEST 63 OUTPUT LEVEL 64 FREQUECY CHECK 65 FACTORY ADJ. 66 SCANNER ADJ. 67 PRINT SCANREF 68 RINGER TEST	71 SYSTEM REPORT 72 SERV: REPORT 73 SET BITSWITCH 74 NCU PARAMETERS 75 CHANGE MEMORY 76 PRINT MEMORY	81 RAM TEST 82 KEY TEST 83 LED TEST 84 LCE TEST 85 SPEAKER TEST 86 PRINTER TEST 87 EXT.MEM TEST 88 ADF TEST 89 PICKUP TEST	91 LIU PARAM 92 TONE PARAM 97 UNIT TEST EFW 98 SET FCU 99 ENGINE PARAM	

CURRENT SETTINGS

YOUR NAME:		SERVICE
YOUR TEL. NO:		12345
DIAL MODE:		TONE
PABX:		YES
DAY:	RINGS TAM	5
	FAX RINGS:	5
	RINGS	MIDDLE
	MONITOR	NO
NIGHT:	RINGS TAM	5
	FAX RINGS:	5
	RINGS	MIDDLE
	MONITOR	NO
TIMER DELAY:	06:00-22:00	
EASY LINK:	FAX RECEPT:	*5
	TRANSFER:	*0
	REL. LINE:	**
INTERNET	E-MAIL RECEPTION	AUTO
	FAX INTERNET	YES
	SERVER NUMBER	
	AUTORIZ. NUMBER	
ROM VERSION:	V 1.00 AA AT	

MENU SELECTION
To change the settings press OK Key and enter the corresponding function number listed on the top of the page function list (on top)

IMPORTANT
If you want to change the ring count for the answering machine or fax reception, please read the Help Page 4 first (Fax and Fax Switch).Press Help and 4 to print it out

HELP PAGES FOR THE PRINT OUT
1. General help (overview)
2. Easy Install
3. Telephone and answering device
4. Fax and Fax Switch (fax reception)
5. E-mail and internet function
6. Scanner (scannig device)
7. Function list (current settings)

PROCEDURE
=> press HELP key
=> select desired topic using arrow < >
keys corresponding number key.
=> press OK Key

Product information and user manual on the internet: www.fax.philips.com

4.2 COMPONENTS

4.2.1 User and Service functions

USER FUNCTIONS

- Installation (Help Key is also use for quick Install)
- Fax
- Active Fax Switch
- Others
- Answering device

NOTE: Funtions are grouped in a logical operation way.
Press the FUNCTION key three times to print out the User Functions.

THE SERVICE FUNCTIONS CONTAINS THE CHAPTERS:

- Adjustments
- Reconfigure
- General tests
- Tel. unit

NOTE: Enter in the Service Mode, press the START key long. Press FUNCTION 3 times to print out the Service Functions
In this mode, you get a complete overview from all the functions.

4.2.2 Current settings

For a prompt survey of all important informations there is add a Current settings list under the Function list.

THE CURRENT SETTINGS LIST CONTAINS:

- Your Name: Stored name
- Your Tel Nr.: Stored telephone number
- Dial Mode: Pulse/Tone
- PABX: PABX select - yes/no
- Day: Fax - number of Rings and Toll free rings
- Night: TAM - number of Rings and Toll free rings
- Timer To set timer for Day and Night operation. Two 12 hour frame.
- Easy Link: *Tone selection.. Remote Fax RX *5, Forwarding *0, Release Line ***
- ROM Version: Software version, Country code
- Internet: connection to the server

5 USER FUNCTIONS

5.1 TABLE OF USER FUNCTIONS

5.1.1 Installation

Nr	Function name	Description
11	Set language	Set 5 different languages. Messages and reports will be printed or show in the language you have chosen
12	Time and Date.	The time setting in term of PM and AM time.
13	Your Tel. No.	To be printed in the page header.
14	Your Name	To be printed in the page heather.
15	Dial Mode Net	Pulse or Tone. PSTN and PABX purpose
17	Net Connection	Set connection with the server
18	Pre Paid Card	Type in pre-paid card code

5.1.2 Fax

Nr	Function name	Description
21	Slow (4800bps)	Half speed transmission (4800 baud: ON/OFF)
22	Polled reception	To call another station and receive a document.
23	Polling Send	To set later Fax Poll
24	Send later	To set a document to be sent within the next 24 hours Can chose any resolution mode.
25	Broadcast	One e-mail can be sent to more than one address
26	E-Mails	To fax via e-mail or to send small messages
27	Internet Polling	To receive internet pages
28	E-Mail RX	To turn on/off automatic e-mail reception (printing)
29	Fax to net	To turn on/off automatic e-mail transmission

5.1.3 Faxswitch

Nr	Function name	Description
31	Day	Set fax rings
32	Night	Set TAM rings
33	Timer	Set up Day and Night time in a 12 hours frame.
34	Easy Link	Fax RX *5, Forwarding *0, Release line **

5.1.4 Others

Nr	Function name	Description
41	Fax Journal.	Print TX/RX report
42	Dialling list	Print numbers stored in memory
43	Trans. Report	Print report after every transmisson.
44	Ringer types	Selection between 4 different ringer types.
45	Service code	Service access codes to erase/change : 7117-Fact. settings, 7140 User settings,... etc
46	Reduction	To reduce the page size to A4
47	Contrast	To set the contrast for copy/transmission.

5.1.5 Answering device - 30 min. Rec.

Nr	Function name	Description
51	Record time	Setting for the recording duration of calls 30 /60 / 120sec / AUTO.
52	Access code	To set the code for remote control and for message forwarding.
53	VIP code	Authorised callers can override the answering device.
54	Memo mode	To record a internal or external message.
55	Forwarding	Message forwarded to another telephone number, from the TAM.

6 SERVICE FUNCTIONS

6.1 ENTERING AND EXITING A SERVICE FUNCTION

6.1.1 To enter a service function

1. Press START 4 seconds You hear two bips!! Press START,..STOP 4 times, unitl you see an Icon in right side of the display.
2. Select the function with the numeric keypad or the keys LEFT and RIGHT and press OK.

6.1.2 To exit a service function

1. Press STOP twice in each function, to go into the standby mode. The FUNCTION key toggles between special functions in a group.
2. After timeout (40 sec), the system will switch the service mode off.

NOTE: For service functions the keys LEFT, RIGHT, OK, *, #, START and STOP are used.
For setting of hexadecimal A through F, you must press down and hold the keys 0...5 for around 2-3 seconds

HEX	A	B	C	D	E	F
key	0	1	2	3	4	5

6.2 TABLE OF SERVICE FUNCTIONS

6.2.1 Adjustments

Nr	Function name	Description
61	MODEM test	Permits to send a specified Freq. or baud rate to the tel. line and speaker. (external measuring instrument needed). Used to check if the Modem is working
62	DTMF test	Send a specified DTFM signal to the tel. line (external measuring instrument needed).
63	Output level	Used to adjust Fax output signal. Country dependant. FACTORY ONLY
64	Frequency check	To generate and output a sine wave with selectable frequency (100 Hz steps) at the defined output level. FACTORY ONLY
65	Factory adjust	1.) To check software and country version. 2.) To set output level using the * / # keys (external measuring instrument needed). 3.) To make a Soft reset: Memory Test and RAM clear
66	Scanner adjust	Used to check the correct function of the LED-array.
67	Print scanner Ref	reference line used to check the CIS.
68	Ringer Test	Test ringer. press stop to end the test.

6.2.2 Reconfigure

Nr	Function name	Description
71	System Report	Prints out the current system parameters.Used before changing or replacing FCU.
72	Serv. Report	Prints out the most recent 10 codes. Use before changing LIU / FCU
73	Set bsw	Only for BSW settings
74	NCU param	Only for NCU settings
75	Change Memory	Only for Factory
76	Print Memory	Print memory settings. Factory only

6.2.3 Configuration

Nr	Function name	Description
81	RAM test	To test correct function of RAM. FACTORY ONLY
82	KEY test	To test correct function of all keys.
83	LED test	To test correct function of all LED's.
84	LCD test	To test correct function of the LC-display.
85	Speaker test	To test correct function of built in speaker.
86	Printer test	To test correct function of the thermal head.
87	Ext. Mem Test	EPROM test for TAMless, Flash test for TAM model. FACTORY ONLY
88	ADF test	Used only by the Factory
89	PICKUP Test	Used only by the Factory

6.2.4 General Tests

Nr	Function name	Description
91	LIU param	Edit the contents in the LIU-parameters.
92	Tone param	Edit contents in the Tone Parameters. FACTORY ONLY
93	CNG Change	Use only by the Factory
97	Unit Test Menu	Used only for debugging. Factory only.
98	Set FCU	Set factory parameters and clear Flash Memory, change country code etc..
99	Engine param	Edit engine parameters. FACTORY ONLY

6.2.5 EPROM - Installation / Replace

Print out the System Report - Function 71, before replacing the EPROM or the FCU.
To replace the EPROM, disconnect the machine from the main Power. Turn the machine over and remove the 3 screw of the print cover. Carefully open the cover (see section 7.9)

WARNING !

Do not force the EPROM. Pull even the chip. The EPROM can be damaged if mishandled.

Clean the Scanner and the Scanner Roller. Power up the Fax. Check the Display. A serial of tests will begin to assure that the EPROM has been correctly installed. Scanner Adjust will be tested. To reinitialize used Software, disconnect the machine, press and hold Start and * keys and connect the machine again.

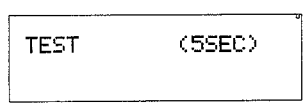
INITIALIZATION PROCESS -

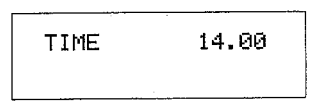
Ext. Memory (5 sec)
Test (10 sec)

The following test will be displayed under Test Mode (press STOP after each test).
RINGER TEST

Then, appear the "Printing" command. Is not necessary to print out the Tests. If the Set has reached this status without failures, then DISCONNECT the Set from the main Power for around 5 seconds. Connect again.

On the display you will see:



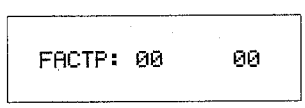


SET COUNTY CODE

Now, the EPROM has been checked and accepted.
To program Country after replacing EPROM or FCU, or if the set remains in version UT. (only english language is available)

1. Enter Function 98

   The LCD shows:



   First 2 digits = Factory byte address/Second 2 digits = Country Code

2. Press 01 for the address, then Start. Then country code 0B, 0C, 07..etc (see table page 2_15) press OK.
   A Test will run, then set Time and date.

6.2.6 SERVICE CODE - Function 45

The service code is define as a code which consists of a maximum of 7 length digits with an additional digit as checksum. The service codes are usually used by the Service Technician or the Help Desk.

1. Enter Funtion 45.
2. Enter the code as needed.

See Table and Formats:

NCU settings:	TAAPPPC
BSW settings:	TAABC
Aditional Parameters:	TSAAPPPC
System Specific Settings:	TNNC

T:	Type of parameter
AA:	Address number
PPP:	Parameter it self(3digits)
C:	Chechsum
B:	Specifies the bit number.
S:	Subgroup 1=Set tone detection, 2=set LIU, 3=Set factory information.
NN:	Serv. No.

TYPE OF PARAMETER

1 Set NCU parameters 00-99
2 Set NCU parameters 100-199
3 Set BSW bitswitches
4 Clear BSW bitswitches
5 Toggle BSW bitswitches
6 Set additional Param.. LIU and Factory info
7 System Specific Settings
8 Reserved
9 Reserved

SERVICE NUMBERS

10 System Reset-Complete-Factory tests and defaults
11 System Reset-Complete-Factory defaults
12 Clear Phone Book
13 Clear TAM contents
14 Clear user config.reset all except Name- Tel. No.
15 Clear user configuration-reset all
16 Clear Line Interface Configuration
17 Clear Tarif information
18 Clean Printhead
19 Clear OGM1-OGM2-restore pre-recorded OGM´s
20 Clear RAM
21 White reference
22 DMM clear

Example for NCU (type 1 and 2):

Change parameter 7 to 123. Format TAAPPPC.

e.g.:	Set NCU	address NCU	parameter to be changed	checksum	code
	1	07	123	5	1071235

Example for BSW (type 3, 4 ,5):

Set BSW 13/3. Format TAABC

	Set BSW	Address No.	Bit number	Checksum
Code:	3	13	3	5

Example for Additional Parameters (type 6):

1. Set Tone detection param. 8 to 87. Format TSAAPPPC.
2. Set LIU Param. 13 to 45.

	Set addit. Param.	Subgroup	Address No.	Parameters	Checksum
a. Code:	6	1	08	087	7
b. Code:	6	2	13	045	3

Example for System Specific Settings:

Erase modifications to factory settings. Format TNNC

	Syst. Spec. Settings	Service Number	Checksum
Code:	7	11	7

Checksum is the residuous from the initial code digit Format divided by Modulo 11.
Ex. 711(TNN) : 11 = 64,6 residual 7 or in a scientific calculator 711 - MOD - Enter = 7

Summary from usual Service Codes:

7106: System Reset (reset all)
7117: Restore Factory default
7128: Clear Phone Book
7139: Clear TAM
7140: Clear User Configuration
7150: Clear conf. (tel-name included)
7161: Clear LIU
7194: Restore pre-recorded OGM
7205: RAM clear
7216: White Reference (new ref!)
7227: DMM Clear

6.3 DETAILED DESCRIPTION - SERVICE FUNCTIONS

6.3.1 Adjustments

MODEM TEST - FUNCTION 61 - FACTORY ONLY

This function permits to send a specified frequency or baudrate to the telephone line for measuring purposes (9600,7200,4800,2400,300 Bps). Used to test if the Modem is working if problems at RX/TX

DTMF TEST - FUNCTION 62

This function permits to send a specified DTMF signal to the telephone line for measuring purposes.

OUTPUT LEVEL - FUNCTION 63 - FACTORY ONLY

This function permits to change and define the output level for sending signals CNG, CED, FSK (300bdp) and high speed pixel data to avoid a telephone line problem.

FREQUENCY CHECK - FUNCTION 64 - FACTORY ONLY

This function permits to send a definable frequency to the telephone line and the speaker. The frequencies can be set in 100 Hz steps with a defined output level.

FACTORY ADJUST - FUNCTION 65

This function consists of two levels. The first level gives SW-informations about the version number, creation date and country code. The second level permits to set the correction value for the OUTPUT LEVEL or to make a RAM CLEAR if necessary.

NOTE: Make a print out of the system report (service function 71) and the dialling list (user function 52) before doing a RAM clear.

1. Enter the service function

   The LCD shows: `V0.1,43. 17.03.98. AT`

   X = Software version
   D = Day*
   M = Month*
   Y = Year*
   C = Country (eg. AT: Austria, DE Germany, S: Sweden etc)

   *(generated date of SW)

2. Press Start

   The LCD shows: `0.LEV  RAMC`

3. Press LEFT to select "Output Level"
   With * and # the user is able to adjust the correction value for the output level (range from 1..255).

4. Press RIGHT to select "RAM Clear"

   The LCD shows: `ARE YOU SURE?`

   If START key is pressed, a soft reset is performed, which includes a Whole memory test and a RAM clear.

SCANNER ADJUST - FUNCTION 66

Use this function to check the correct functioning of the scanner LED array or detach scanner and press Start

1. Enter the service function
   The CIS-LED array is on.
2. Press STOP - the CIS-LED array is off.

PRINT SCANNER REFERENCE LINE - FUNCTION 67

Use this function to check the CIS via print out of the scanner reference line. The reference line is a diagram of the values which are used for the auto shading correction. If the line comes close to the top level or if there are significant peaks it indicates problems with the CIS. Please follow this procedure, before you change the CIS:

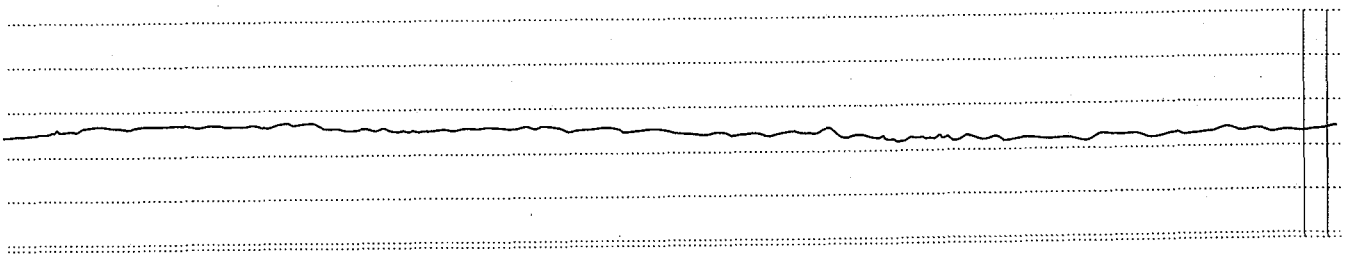
1. Enter in Service Mode (Start..Stop..) Function 67 - Print Scan Ref... OK. This is the original Factory Adjustment.

2. You are in Service mode...Function 05 - Scan Ref Analysis. This is the actual value scanned against the Scann Roller, though, is a temporary value. Compare both References, the Factory Ref and the Temporary Ref.

3. If the Factory Adj. present defects, and the temporary value looks fine, we can proceed to use Function 45 code 7216. This new value will be stored in memory.
   If the Temporary Scan Analysis present defects, but the Factory Adj. looks fine, proceed to power Off / On the machine. (disconnect from the mains)

4 Take in account that the CIS and the Scan Roller have to be clean, in order to obtain a good reference.

Example for Scanner reference line. Spikes or drastic drops mean a possible defect. Clean the CIS, and try again.



If a bad Scan-Ref is obtained, you have to find the cause of the problem (dust, dirt, corrector, defected CIS or Roller..etc). Clean or Repair the Scanner if necessary. If the reference line is not in the middle, but shifted slidly up or down, this will not be taken as an error, as long as the Ref. Line it self is as shown. It is recomended to make a copy in Photo Mode to test the results.

RINGER TEST - FUNCTION 68

Use this function to check the ring of the fax machine.

6.3.2 Reconfigure

SYSTEM REPORT - FUNCTION 71

Use this function to print the actual system parameters like TTI, CSI, ROM/LIU-Version, CCITT number, Maker code, Country Version, Bit switches and NCU parameters.
If possible, print out this list before repairing or replacing the FCU and before refilling the system parameters.

Enter the service function.
The system report list will be printed now.
Page 1 shows BSW and NCU parameters list, and Page 2 the second part of NCU and LIU Parameters.

Example for a System report:

SYSTEM REPORT 15-OCT-99 13:47

```
YOUR NAME:
YOUR TEL. NO.:
ROM VERSION:        V1.54 2A G2MV 16.04.98 17:37 AT 020 01 FA4 006
CCITT/MAKER:        A/1
OUTPUT LEVEL:       -10DBM
FACTORY INFO:       x00 x10 xFF xFF xFF xFF xFF xFF

BITSWITCH   DEFAULT   ACTUAL     BITSWITCH   DEFAULT   ACTUAL
       00  10110000   10110000          04  01111111   01111111
       01  00000001   00000101          05  01010000   01010000
       02  01100010   01100010          06  11100001   11100001
       03  01100100   01100100          07  11000000   11000000

NCU PARAM.  DEFAULT   ACTUAL     NCU PARAM.  DEFAULT   ACTUAL
       00    042/2A   042/2A            34    000/00   000/00
       01    030/1E   030/1E            35    015/0F   015/0F
       02    018/12   018/12            36    060/3C   060/3C
```

Line "ROM VERSION" means:

e.g.:	SW-Version	SW	Date (SW)	Time	LIU-Country	OPU-configuration	Factory code	ARAM-amount	LIU-code
	V1.54	2A G2MV	02.06.98	17:37	AT	020	01	FA4	006

Line "CCITT/MAKER" means:

e.g.:		Output Level
	A/1 made in Austria	-10DDM

Factory Info

at the moment only the country setting (2nd positon-X10 - is used. See table in page 2-16 to check country code.
All other parameters are reserved for future use.

Columns "BITSWITCH / NCU PARAM" means:

e.g.:	Bitswitch Nr. 00	Default value 00000010	Actual value 00000010
e.g.:	NCU Parameter Nr. Dec/Hex 0/00	Default value Dec/Hex 42/2A	Actual value Dec/Hex 42/2A

SERVICE REPORT - FUNCTION 72

Print the most recent 10 error codes, and gives the informationon the 5 most recent communications that experienced errors.

SET BITSWITCH - FUNCTION 73 - ONLY FOR FACTORY PURPOSES

Use this function to change a bit in the config bitswitch area.

WARNING !

Do not change a bit switch that is described as "Not used", as this may cause the machine to malfunction or to operate in a manner that is not accepted by local regulations.

1. Enter the service function

   The LCD shows: `BSW: 00  10110000` (cursor blinks under 00)

   00 BSW-adress, starts with 00 (HEX)
   XXXXXXXX Value field; each X stands for a single bit of setting (0=not set, 1=set)

2. Enter the required BSW-adress via the numeric keypad and the R-key with the numeric keys 0 - 5 simultaneous for A - F to change the address field (all input values are hexadecimal).
   It's also possible to in/decrement the address with "*" or "#".
3. Press START to move from address field to value field.
4. To change a certain bit use the numeric keypad - just type its position number now

bit-number:	7	6	5	4	3	2	1	0
position	x	x	x	x	x	x	x	x
eg.: BSW 07:	0	1	0	1	0	1	0	1

   -> Bits 6,4,2,0 are set to 1

   NOTE: If the bit was initially (before setting) "1", it's now "0" and vice versa.
5. Press START to switch back to address field.
6. Press OK to exit this function, followed by STOP.

NCU PARAMETER - FUNCTION 74 - ONLY FOR FACTORY PURPOSES

Use this function to adjust parameters for timing detection and dialling.
The NCU parameters are in the following chapter.

1. Enter the service function.

   The LCD shows: `NCU: 00  042` (cursor blinks under 00)

   NN NCU-adress, starts with 00 (HEX)
   XXX Decimal value setting of NCU parameter NN

2. Enter the required NCU parameter-adress via the numeric keypad and the R-key with the numeric keys 0 - 5 simultaneous for A - F to change the address field (all input values are hexadecimal).
   It's also possible to in/decrement the address with "*" or "#".
3. Press START to move from address field to value field.
4. Change the desired value (DEC) via the numeric keypad

   e.g.: `NCU: 1F  0A` -> NCU 1F is set to value 10 (DEC)

5. Press LEFT or RIGHT to correct wrong Data entries.

6. Press START to switch back to address field.

   NOTE: Changing the value is immediately accepted, no way return to previous if mistyped!

7. Press OK to exit this function, followed by STOP.

CHANGE MEMORY - FUNCTION 75. ONLY FACTORY USE

Use this function to check the ROM/RAM and change the RAM contents.
The RAM addresses are listed

WARNING!

The user must be well aware of the meaning of these locations before making any change in RAM!
This may cause the machine to malfunction.

PRINT MEMORY - FUNCTION 76-FACTORY ONLY

Use this function to printout a certain memory area.

Example for a Memory-print out

```
E000 : DF  FF  FF  FF  FF  FF  FF  FF    FF  FF  FF  FF  FF  FF  FF  FF
E010 : FF  FF  FF  FF  FF  FF  FF  FF    FF  FF  FF  FF  FF  FF  FF  FF
E020 : FF  FF  FF  FF  FF  FF  FF  FF    FF  FF  FF  FF  FF  FF  FF  FF
E030 : FF  FF  FF  FF  FF  FF  FF  FF    FF  FF  FF  FF  FF  FF  FF  FF
E040 : FF  A0  03  69  50  35  3C  31    73  61  28  93  0F  00  00  00    .IP5 1SA ( ....
E050 : 00  01  00  0C  69  B0  59  35    1B  A4  3D  1D  72  69  69  9F    ....I Y5.Ñ=.RI
E060 : 00  00  00  01  01  8D  C0  D0    59  35  1B  A4  3D  1D  72  69    .....  I  Y5.Ñ=.RI
E070 : 69  9F  00  00  00  01  00  8C    D9  D1  59  35  1B  A4  3D  1D    I .....  I Y5.Ñ=.
E080 : 72  69  69  9F  00  00  00  01    00  8C  5F  BC  5A  35  1B  A4    RII .....  Z5.Ñ
E090 : 3D  1D  72  69  69  9F  00  00    00  01  00  8C  B5  EA  5A  35    =.RII .....  Z5
E0A0 : 3C  31  D4  0D  27  34  71  0F    00  00  00  01  00  8C  B7  12     1 .'4G......
E0B0 : 5B  35  1B  A4  3D  1D  72  69    69  9F  00  00  00  01  00  8C    [5.Ñ=.RII .....
E0C0 : 07  13  5B  35  1B  A4  3D  1D    72  69  69  9F  00  00  00  01    ..[5.Ñ=.RII ....
E0D0 : 00  8C  77  13  5B  35  1B  A4    3D  1D  72  69  69  9F  00  00    . W.[5.Ñ=.RII ..
E0E0 : 00  01  00  8C  16  67  5C  35    3C  01  40  70  83  51  FF  9F    ... .G 5 . P Q
E0F0 : 00  00  00  01  00  8C  FF  FF    00  10  FF  FF  FF  FF  FF  FF    .....  ..
```

6.3.3 General tests

RAM TEST - FUNCTION 81 - FACTORY ONLY

Use this function to do a RAM TEST, after the test the result will be returned.

"RAM TEST ERROR" is printed. If no error is found, the message "RAM TEST OK" is printed.

KEY TEST - FUNCTION 82

Use this function to do a KEY TEST, after the test the result will be returned. Press the keys of the control panel in a certain sequence. The LCD indicates the key to be depressed. The test is finished when the last key (the "START" key) is pressed. If all keys have been pressed correctly, the message "KEY TEST OK" is printed, otherwise the message "KEY TEST ERROR" is printed.

LED TEST - FUNCTION 83

Use this function to do a LED TEST, after the test the result will be returned.

1. Enter the service function
   All the icons of the LCD and the LED on the control panel are flashing in turns.

LCD TEST - FUNCTION 84

Use this function to do a LCD TEST, after the test the result will be returned.

1. Enter the service function
   The LCD should display a black pattern alternating.

SPEAKER TEST - FUNCTION 85

Use this function to do a SPEAKER TEST, after the test the result will be returned.

PRINTER TEST - FUNCTION 86

Use this function to print a test pattern for checking the result.

1. Enter the service function
   Vertical and horizontal lines will be printed.

EXTENDED MEMORY TEST - FUNCTION 87 - FACTORY ONLY

This function permitts to check; print or clear the contents of the AS-FLASH storage.

1. Enter the service function

   The display shows: | EXT. MEM. TEST | press OK

2. Press LEFT or RIGHT to choose Check, Print or Clear the FLASH contents

   The display shows: | EXT.MEM CHECK |

CHECK: Do a check of the directory and the data pointed from directory entrys. By pressing OK, the validation check is done and a **long beep** sounds if the check was **invalid.** That means the directory structure and the data pointed to are invalid. This function can be used after any action with flash.

CLEAR: Do a whole clear of the FLASH chip. By pressing OK, the whole contents of the FLASH chip will be cleared and the directory structure and variables which are used for the FLASH are reinitialized. After that action a system reset is performed to garanty a correct initialization and working of the application.

PRINT: Print out of the contents from the entered block.

ADF TEST - FUNCTION 88 - ONLY FOR FACTORY USE. NOT AVAILABLE IN NEW VERSIONS.

This specific function is not available in new Software versions. In some Old versions is present, though the mechanical test is ONLY for production purposes. The copy operation asures the functionability of the Scanner and pickup Modules.

PICK UP TEST - FUNCTION 89 - ONLY FOR FACTORY USE. NOT AVAILABLE IN NEW VERSIONS

This specific function is not available in new Software versions. In some Old versions is present, though the mechanical test is ONLY for production purposes. The copy operation asures the functionability of the Scanner and pickup Modules.

6.3.4 Tel. unit

LIU PARAMETER - FUNCTION 91 - FACTORY ONLY

The following specifies the functionality of the LIU-parameters.

1. Enter the service mode

   The LCD shows: | LIU PARAM |

2. Press LEFT or RIGHT and OK to print the settings.
3. Press OK to edit the settings.

The LCD shows: | LIU: 00 003 | (cursor blinks under NN)

NN	LIU address (HEX)
XXX	LIU data (DEC)

4. Select the start address with '*' and '#' or the numeric keypad and press 'START'.
5. Edit the data with the numeric keypad.
6. Press LEFT or RIGHT to control the cursor.
7. Press START to select the next address.
8. Press STOP to save and leave function 91.

Example for a LIU-Parameter print out: Not possible to print under this option. See System Report-Page 2

LIU PARAM.	DEFAULT	ACTUAL
00	003/03	003/03
01	002/02	002/02
02	085/55	085/55
03	101/0A	101/0A
04	020/14	020/14
05	101/0A	101/0A
06	011/0B	011/0B
07	085/55	085/55
08	085/55	085/55
09	034/22	034/22

LIU PARAM.	DEFAULT	ACTUAL
0A	070/46	070/46
0B	020/14	020/14
0C	060/3C	060/3C
0D	000/00	000/00
0E	001/01	001/01
0F	001/01	001/01
10	000/00	000/00
11	048/30	048/30
12	025/19	025/19

e.g.:	LIU Parameter Nr. Dec/Hex	Default value Dec/Hex	Actual value Dec/Hex
	00	003/03	003/03

LIU - address HEX 00

Address HEX 00 defines the DIAL MODE REGISTER

Bit Nr.:	7 6 5 4 3 2 1 0
e.g. BIN:	0 0 0 0 0 0 1 1 = Data 03 (DEC)

Bit Nr.	Function	Set	Description
0	dial mode:	0 1	PULSE DTMF
1+2	ground status	1	0: Earth 1: Flash (always Flash)
3	extended dialing	0 1	normal dialing: 0-9, *,#,RECALL, rest not used extended dialing: 0-9,*,#,A,B,C,D
4+5	not used		
6	DTMF-mode	0 1	tone timed tone as long as key pressed (the tone on time is as long as the specific key is pressed but it has a minimum time which is the same like DTMF-mode is 0.)
7	MSG-mode	 0 1	If pulse dial is selected and '*' or '#' will be pressed then dialmode will be switched to DTMF. Inactive: '*' or '#' will not dialed out - a pause will be made. It's not possible to switch back to pulse dialing. Active: '*', '#' or 'R' will be dialed out after the last interdigit pause has been performed. By pressing the R-key it's possible to switch back to pulse dialing (after DTMF has been finished).

Switching from pulse dial mode to DTMF: Switching from pulse to DTMF dialling will be done by pressing Function key, then function 15

Switching from DTMF mode to pulse dial:
The function 15 can be return to original position, using the user settings list. It is not recomended that the BSW changed, due to the fact that the sets have been adjusted under specific parameters per country.
Note: some countries cannot switch between DTMF to Pulse due to Country Specifications.

PPS	break ratio (%)	break (ms)	make (ms)	dial time (ms)
10	60	60	40	100
10	66	66	33	100
20	60	40	20	50
20	66	34	17	50

e.g.: Bit Nr.: 7 6 5 4 3 2 1 0

BIN 0 0 0 0 0 0 1 0 => Data 2
BIN 0 0 0 0 0 0 1 1 => Data 3

Bit Nr.	Function	Set	Description	
0	Dialing Speed	0	10 PPS	
		1	20 PPS	
1	Break/Make Ratio %		**10 PPS**	**20 PPS**
		0	60/40	40/20
		1	66/33	34/17

LIU - address HEX 02 to 0F

Addr. (HEX)	Function	Value	Divide value by	Description
02	Inter digit time (delay)	10...2550ms	10ms	see fig.1
03	Flash time	10...2550ms	10ms	
04	Access pause time	100...6500ms	100ms	
05	DTMF level high	-2...-15dbm	-1dbm	
06	DTMF level difference	-4...+4dbm	0,1dbm	*)
07	DTMF on/off	3...255ms	1ms	
08	DTMF off	3...255ms	1ms	
09	Min detected ring frequency	10...100Hz	1Hz	
0A	Pulse Break	60	-	Typical factory setting
0B	Ring Min. Freq.	60	-	"
0C	Ring MaxFreq.	65	-	"
0D	PABX DIFF	00	-	"
0E	Country Code	016	Decimal	"
0F	**Country Back up**	**016**	**Decimal**	"

Under address 0E, the country value is decimal. eg. Austria 016, Germany 011 etc. If you change the country code, please be aware that the machine will recocgnize the language being set, and Function 11 - language setting will be not possible.
The machines have specific settings per group of countries, take this in account when changing the Country Code.

Note:

Super Galileo fax sets are programmed to be used in a DTFM environment

Country Codes

Country	A	B	C	D	E	F	G	H		
Argentina					1D					
Austria			10							
Belgium		0F								
Brasil					1D					
China								13		
Czech Republic							16			
Denmark						0E				
Finnland						0D				
France	0C									
Germany	0B									
Greece				0A						
Int(ernational)				1F						
Italy	08									
Mexico					1A					
Netherlands		07								
Norway						06				
Portugal				05						
Singapure					12					
Spain				04						
Sweden						03				
Switzerland			02							
ÛK	01									

Country Code Group. HEX Codes full compatible with the Decimal codes from LIU address 0E. (e.g. HEX 10 = Dec 16)

To change the country code with this Table, use Funtion 98.

1. Enter service mode, Press START 4 seconds You hear two bips!! Press START...STOP 4 times, unitl you see an Icon in right side of the display.
2. Enter Funtion 98, press OK. Enter Address 01 press Start. enter Country code.HEX value. Press OK. This address is a factory address and NOT a FCU or LIU address. Is a Default Factory Setting. Be sure to programm the right country for the SW.

TONE PARAMETERTEST - FUNCTION 92

This function is used to edit contents in the TONE PARAM. Define address range is 0....38 Hex.

UNIT TEST MENU - FUNCTION 97

Only used for Debbuging. Only info.

SET FCU - FUNCTION 98

To set factory parameters. This parameters are described for the Final Unit Test SW-requirements.

ENGINE PARAMETERS - FUNCTION 99

This function is to edit contents of the Engine Parameters. Only info.

CONFIGURATION SHEET

COUNTRY 01 COUNTRY SPECIFIC (SEE COUNTRY-CODES TABLE)

PANEL 02 00 UK PANEL
02 F PANEL

PRINTER 03 00 COMMON

SCANNER 04 00 DYNA
01 ROHM

INKFOIL 05 01 50 SHEETS

LIU 06 COUNTRY AND TYPE SPECIFIC

	D	F	UK	IT	NL	A	E	B	S	CH	ARG	BRA	CN
SG5	19	9	19	11	19	9	19			19			
SG12@	19	9	19	11	19	9	19	19	19	19	19	19	1C
SG17@	19	9	19	11	19	9	19	19	19	19	19	19	1C
SG27@	13	13	13	13									

FEATURE_A 07 COUNTRY AND TYPE SPECIFIC

	D	F	UK	IT	NL	A	E	B	S	CH	ARG	BRA	CN
SG5	21	21	21	21	21	21	21			21			
SG12@	7D	7D	7D	7D	7D	7D	7D	5D	5D	5D	5D	5D	5C
SG17@	FD	FD	FD	FD	FD	FD	FD	DD	DD	DD	DD	DD	DC
SG27@	FD	FD	FD	FD									

FEATURE_B 08 00 COMMON (Reserve)

TABLE_A 09 COUNTRY AND TYPE SPECIFIC

	D	F	UK	IT	NL	A	E	B	S	CH	ARG	BRA	CN
SG5	CB	CB	CB	CF	CF	CB	CF			CB			
SG12@	CB	CB	CB	CF	CF	CB	CF	CF	CF	CB	CF	CF	48
SG17@	DB	DB	DB	DF	DF	DB	DF	DF	DF	DB	DF	DF	58
SG27@	78	78	78	78									

TABLE_B 0A COUNTRY AND TYPE SPECIFIC

	D	F	UK	IT	NL	A	E	B	S	CH	ARG	BRA	CN
SG5	11	17	17	27	31	17	37			7			
SG12@	11	17	17	27	37	11	37	27	27	7	27	27	6
SG17@	19	1F	1F	2F	3F	19	3F	2F	2F	0F	2F	2F	6
SG27@	11	17	17	27									

TABLE_C 0B 80 COMMON

REPLY 0C 00 COMMON

6.4 TABLE OF BSW AND NCU-PARAMETER

6.4.2 BSW listing

The bitswitches are the 1-bit sytem parameters that determine the machine's behaviour.

For HEX codes, press long the keys 0 though 5 (0=A / 1=B / 2=C / 3=D / 4=E / 5=F).The settings of the switches are (1=ON, 0=OFF).

GENERAL

	Byte	Bit	BSW Name	Description
	00	0	BSW_PSTN_DIALTONE	PSTN dialtone detection en/disable
	00	1	BSW_PABX_DIALTONE	PABX dial tone detection en/disable
	00	2	BSW_BUSY_DETECT	Busy tone detection in TAM mode and during dialling
	00	3	BSW_LOOP_CURRENT	Loop current detection en/disable
	00	4	BSW_COUNTRY_DIALTONE	Country dial tone detection (see NCU parameter 09 and 0A
	00	5	BSW_INT_DIALTONE	International dial tone detection en/disable
	00	6	BSW_PARALLEL_PHONE	*1 .. if parallel phone is used*
	00	7	BSW_GRANDMOTHER	Redial only when busy
	01	0	BSW_SPEAKERT30	Speaker operation during T30 handshake
	01	1	BSW_SPEAKERV29	Speaker operation during T30 handshake and V29 operation
	01	2	BSW_PARADISPL	Display of parameters instead of CSI
	01	3	BSW_PAPER_SAVE	reduce received document to half length
	01	4	BSW_JOURNAL	en/disable Journal printout
	01	5	BSW_PABX_MODE	0: PSTN 1:PABX connection
	01	6	BSW_TXREPORT	Automatic print out of transmission report
	01	7	BSW_KEY_TOUCHTONE	Key press acknowledge tone generation
	02	0	BSW_WAIT_DIAL_DIGITRDY	Special FTZ requirements (18TR53) for Germany
	02	1	BSW_CALLER_ID	1:enable/0:disable caller ID function
	02	2	BSW_PABX_BUSY_BEFORE_DIAL	BUSY detection BEFORE DIAL (to avoid misdetection of PABX dialtone)
	02	3	BSW_FRENCH_BURNED_NUMBER	After last unsuccessful redial disable start access to a stored number
	02	4	BSW_SEQ_MAX_PAUSE	not used
	02	5	BSW_BUZ_FOLLOW_RING	
	02	6	BSW_LONG_REP	Increases the length of reports (e.g.: error report, transmission report,...)
	02	7	BSW_FULL_REDIAL	Redial of '*' and '#' if set'
	03	0	BSW_MERCURY	
	03	1	BSW_SHEETFEEDER	1.. with sheetfeeder
	03	2	BSW_SIZE_COMPRESSION	
	03	3	BSW_DATEMDY	format date display
	03	4	BSW_12CLOCK	clock format is 12h format instead of 24h
	03	5	BSW_MONTHLETTER	Display format of month
	03	6	BSW_COSTCOUNT	Not used
	03	7	BSW_REM_TIMEOUT	TAM remote control TIMEOUT after 50s of remote user DTMF inactivity
	04	0	BSW_RDS_FOREVER	RDS TIMEOUT - RDS access is switched off after 24h
	04	1	BSW_SPEECHREC	possibility to record a phone conversation
	04	2	BSW_TAM_DIAL_DET	Dialtone detection in TAM mode (stops recording when detected)
	04	3	BSW_TAM_SPEAKER	Call monitoring during ICM RECORD
	04	4	BSW_TIMESTAMP	TIME STAMP: on, shows date and time of call during ICM playback.
	04	5	BSW_ENABLE_RDS	Possiblity to select REMOTE DIAGNOSTIC for the user
	04	6	BSW_FWD_REDIAL	Redial attempts in FORWARDING mode.
	04	7	BSW_BEEP_OGM2	Beep before OGM2
	05	0	BSW_SLOW_4800BD	slow down baud rate for FAX
	05	1	BSW_PULSE_DIAL_ENABLE	en/disable use of pulse dial features and functions
	05	2	BSW_FSW_FRANCE	special FSW behaviour for FRANCE
	05	3	BSW_PAPERFEEDER	en/disable paper feeder
	05	4	BSW_DUMMY0	test use only
	05	5	BSW_DUMMY1	test use only
	05	6	BSW_PGHDR_INSIDE	1: page header inside of document 0: outside
	05	7	BSW_COPY_MODE	1: 20ms/line for scanning -Germany only 0: 10ms/line
	06	0	BSW_FAX_EARLY_CNG	
	06	1	BSW_FAX_FALLB_RTN	
	06	2	BSW_FAX_VOICE_REQUEST	1: enable voice request for FAX session 0: disable
	06	3	BSW_FAX_ECM	
	06	4	BSW_FAX_ECM_MEM_SIZE	
	06	5	BSW_FAX_FRAME_SIZE	
	06	6	BSW_FAX_A4	
	06	7	BSW_PGHDR_AUTO_A4	1: ON 0:OFF

	Byte	Bit	BSW Name	Description
	07	0	BSW_PGHDR_ON	1: ON 0:OFF
	07	1	BSW_FAX_AUTOSTART	1: ON 0:OFF
	07	2	BSW_LOG_FAX	enable only for debugging
	07	3	BSW_LOG_EVENT	enable only for debugging
	07	4	BSW_LOG_UART	enable only for debugging
	07	5	BSW_LOG_UNITTEST	enable only for debugging
	07	6	BSW_UT_SKIP_FUN	only used for Factory-unittest
	07	7	BSW_PSTN_DTONE_IN_PABX	1: enable PSTN dial tone detection if in PABX mode 0: disable
	08	0	BSW_FSW_PASSIVE	1: ON 0:OFF
	08	1	BSW_PTT_TIMER_LED	1: ON 0:OFF (for OEMPTT panel IT use TAMON_LED as TIMER mode identification)
	08	2	BSW_TIME_SAVE	1:save system time (use for CN only @841.1)
	08	3	BSW_MODE_BACKUP	x:save mode too (use for CN only @841.1)
	08	4	BSW_CNG_LONG	1: ON 0:OFF
	08	5	BSW_CSI_SERVICE_SET	1: ON 0:OFF (ON .. only service/PTT can define it)
	08	6	BSW_PRINTER_AUTO_PAGE	1: ON 0:OFF (ON .. automatic separation, OFF .. drop lines)
	08	7	BSW_PAPERSIZE_USA	1: ON 0:OFF (OFF .. Europe, ON .. USA)
	09	0	BSW_PAPERSIZE_LEGAL	1: ON 0:OFF (ON .. Legal 356 mm, OFF .. Letter 277 mm)
	09	1	BSW_EXTPH_ONH_CHECK_PAR_EN	1: no TAM 0: with TAM
	09	2	BSW_EMAIL_LEAST_COST_INT	
	09	3	BSW_EMAIL_LEAST_COST_NAT	
	09	4	BSW_EMAIL_RX_AUTO	
	09	5	BSW_EMAIL_LEAST_COST_INT_EN	
	09	6	BSW_EMAIL_LEAST_COST_NAT_EN	
	09	7	BSW_COPY_SUQA	1: super quality mode 0: normal quality

6.4.2 NCU parameter listing

The NCU parameters are the 1-byte system parameters that determine the machine's behaviour.
They can be modified with function 74.

The adresses are hexadecimal; all values are decimal. Byte numbers are HEX values
The values under "val", are the average values programmed by the Factory. Though are country dependant.

val	Addr	NCU Name	Unit	Description
030	00	NCU_WAIT_LOOPCUR	x*100ms	If no loop current within this time, an error condition occurs
030	01	NCU_RING_ON_CONT	x*100ms	after that time RING is continuous
050	02	NCU_FSW_WAIT_OFFHOOK	x*100ms	time between going off-hook and going to TAM/FAX directly without ringback phase
043	03	NCU_RING_OFF_MIN	x*10ms	Ring must be OFF for this time to detect end of ring. Set this value higher than pause time of double rings.
005	04	NCU_RING_ON_MIN	x*10ms	ring must be ON for this time to detect start of ring. Set this value lower than the 1st ring pulse of double rings
070	05	NCU_FSW_RING_PAUSE	x*100ms	after this time a call is assumed as cancelled. Set time longer than the max pause between 2 rings.
000	06	NCU_INT1_PREFIX		x: int. call sequence can be up to 4 digits (packed in 2 bytes, each byte holds 2 digits).
255	07	NCU_INT2_PREFIX		x: int. call sequence can be up to 4 digits (packed in 2 bytes, each byte holds 2 digits).
015	08	NCU_DOM1_PREFIX		x: domestic call sequence can be up to 4 digits (packed in 2 bytes, each byte holds 2 digits).
255	09	NCU_DOM2_PREFIX		x: domestic call sequence can be up to 4 digits (packed in 2 bytes, each byte holds 2 digits).
010	0A	NCU_WAIT_DIAL	x*s	x*s: max. wait time for dialtone. If not detected within this time, NO DIALTONE is displayed
009	0B	NCU_WAIT_PAUSE	x*100ms	PAUSE-Key time. (old was 20 ms units !!!)
255	0C	NCU_MAX_PAUSE	x*1s	Total delay time allowed for PAUSE-key entries (0=unlimited)
030	OD	NCU_PABX_DELAY	x*100ms	if PABX dialtone detection is disabled (BSW 0 Bit 1), machine waits this time instead of dialtone detection.
030	0E	NCU_PSTN_DELAY	x*100ms	if PSTN dialtone detection is disabled (BSW 0 Bit 0), machine waits this time instead of dialtone detection
004	0F	NCU_MAX_REDIAL		x: max redial attempts to a FAX number including the initial dial.
012	10	NCU_REDIAL_TIME	x*10s	pause time between automatic redial attempts (valid for FAX send a TAM forwarding mode).
001	11	NCU_FAX_FALLB_COUNT		x: training repeat count after FTT
018	12	NCU_FAX_T1_PLUS	x*1s	added time to the standard T1(35s)wait time for a connect; During fax call the machine waits the resulting time'

val	Addr	NCU_Name	Unit	Description
010	13	NCU_FAX_ERRLIMIT		x%: error limit value in percent (in lines not set).
000	14	NCU_FAX_CFRGAP	x*10ms	delay between CFR and messahe phase
040	15	NCU_FAX_RX_ON_LEV	dBm	x: input sensitivity ON level (-43dBm)
044	16	NCU_FAX_RX_OFF_LEV	dBm	x: input sensitivity OFF level
001	17	NCU_FAX_REC_LENGTH		x: 0..A4, 1..unlimited, 2..(A4,B4)
003	18	NCU_FAX_SCAN_LIN_TIM		x: 3 bits represent T30-DIS bits
000	19	NCU_LANGUAGE_DEF		x: 0..GB, 1..D, 2..DK, 3..E, 4..F, 5..I, 6..N, 7..NL, 8..PO, 9..S, 10..SF, 11..S2, 12..GB2, 13..H, 14..CZ, 15..F2, 16..SK, 17..PL, 18..NL2, 19..I2, 20..N2
224	1A	NCU_CALLER_ID_MSK0		bit7 = 1 automatic time update within CLID, bit6 = 1 display name if sent (only if FSK protocol)
000	1B	NCU_CALLER_ID_MSK1		t.b.d
015	1C	NCU_OGM1_LED_ON_TIME	x*s	x*s:after this time has passed during OGM1 recording, the "record-LED" starts blinking.'
006	1D	NCU_OGM1_MIN_LEN	x*s	x*s:the minimum time for OGM1, if set to 0 no minimum time is required for a valid OGM1
020	1E	NCU_OGM1_MAX_LEN	x*s	x*s:maximum length of OGM1 message
010	1F	NCU_OGM2_MAX_LEN	x*s	x*s:maximum length of OGM2 message
008	20	NCU_OGM2_LED_ON_TIME	x*s	x*s:after this time has passed during OGM1 recording, the "record-LED" starts blinking.'
060	21	NCU_FSW_RB_PAUSE	x*100ms	specifies the pause time for TEL/FAX mode between two ringback tones (from start to start of tone)
007	22	NCU_FSW_RB_TYPE		x: Type of ringback tone: (<special first ringback>?(<first ringback type>+1) : 0)*0x10 + <ringback type>
005	23	NCU_FSW_RNG_OFFH		x: number of rings before OFFHOOK. In EXPERT: 2 nibbles (NIGHT, DAY): 0xND
000	24	NCU_FSW_TIM_OFFH	x*100ms	minimum time from first ring to going OFFHOOK
044	25	NCU_FSW_TIM_SILENT	x*100ms	time from going offhook to first ringback
085	26	NCU_FSW_RNG_END		x: # of rings before going to TAM/FAX mode. EXPERT: 2 nibbles (NIGHT,DAY: 0xND). Passive FSW: # of rings in DAY nibble
008	27	NCU_FSW_RNG_TAM_OFF		x: number of audible rings in TAM OFF mode (with automatic fax reception)
019	28	NCU_FSW_MODE		x: Current mode: 2 nibbles (NIGHT, DAY): 0xND
001	29	NCU_FSW_RNG_QUICK		x: FAX rings in QUICK mode
005	2A	NCU_FSW_RNG_NORM		x: FAX rings in NORMAL mode
005	2B	NCU_FSW_RNG_SMART_L		x: TAM rings in SMART mode, long setting
002	2C	NCU_FSW_RNG_SMART_S		x: TAM rings in SMART mode, short setting
119	2D	NCU_FSW_RNG_TAM_ON		x: TAM rings ON mode
011	2E	NCU_FSW_RNG_NEVER		x: rings before detection phase, MANUAL mode
003	2F	NCU_FSW_RNG_1_4		x: TAM rings in RNG1_4 mode
018	30	NCU_FSW_EXP_TAM		x: TAM mode in EXPERT mode (OFF=0, MUTE=1, ON=2): 2 nibbles (NIGHT, DAY): 0xND
034	31	NCU_NIGHT_HOUR		x:BCD hours 0..23 h
000	32	NCU_NIGHT_MIN		x:BCD minute 0..59
006	33	NCU_DAY_HOUR		x:BCD hours 0..23 h
000	34	NCU_DAY_MIN		x:BCD minute 0..59
015	35	NCU_ICM_REC_OPT		x*s:Selectable RECORD TIME
060	36	NCU_ICM_MAX_LEN		x*s:reflects record time value selected with user function 0:automatic (max 255sec)
165	37	NCU_EXT_DTMF		DTMF code for remote control of faxswitch. 8 bits for two DTMF characters
050	38	NCU_TAM_REM_TIME		x*s:if time passed in TAM remote operation, TAM sends lot of beeps, means user has to prolong....
200	39	NCU_FAX_DELAY_BEF_CED		Delay between ring-detection and sending CED (T30 protocol)
000	3A	NCU_TX_ATT_CORRECT		x*dbm: Modem TX signal output correction attenuation. - NOT USED
000	3B	NCU_TX_ATT_COARSE		x*dbm: Modem TX signal output general attenuation.
015	3C	NCU_TX_ATT_FAX		x*dBm: Modem TX signal output level for FAX. (e.g. value 15 -> -10db)
005	3D	NCU_TX_ATT_TAM_LINE		x*dBm: Modem TX signal output level for TAM.
000	3E	NCU_TX_ATT_HFREE		x*dBm: Modem TX signal output level for HANDSFREE.
000	3F	NCU_RINGON_DUPLEX		Ringer on-time for the duplex ringer feature (0=disabled).
000	40	NCU_VOL_CLICK		used for KEYKLICK b0..b3
001	41	NCU_VOL_BUZ		used for RINGER b0..b3 :DAY b4..b7 :NIGHT
001	42	NCU_VOL_SPK		used for TAM & LINE b0..b3
255	43	NCU_MEMO_MAX_LEN		x*s:Maximum length of external memo message
255	44	NCU_MEMO_LED_ON_TIME		x*s:Time, after recording led shoud start blinking.
085	45	NCU_FSW_TOLLFREE_MAX		x: max value of tollfree rings (e.g. 5). Passive FSW: max rings
186	46	NCU_ROM_CHKSUM0		hold system checksum Low byte
122	47	NCU_ROM_CHKSUM1		hold system checksum High byte
000	48	NCU_DUMMY0		Dummy NCU

val	Addr	NCU Name	Unit	Description
000	49	NCU_DUMMY1		Dummy NCU
000	4A	NCU_CABLE_EQUALIZER		
001	4B	NCU_RING_TYPE		x: 0..4 Ringer type
165	4C	NCU_REM_FAX_START		x:nibble *5 FAX start
160	4D	NCU_REM_CALL_TRANSFER		x: *0 CALL transfer
170	4E	NCU_REM_ON_HOOK		x: ** ON HOOK
000	4F	NCU_REM_ACC1		x: 00 two nibbles used
000	50	NCU_REM_ACC2		x: 00 two nibbles used
153	51	NCU_REM_VIP1		x: 99 two nibbles used
153	52	NCU_REM_VIP2		x: 99 two nibbles used
030	53	NCU_LOOP_DET_TIME	x*10ms	if stable for that time loop was detected
030	54	NCU_LOOP_LOSS_TIME	x*10ms	
008	55	NCU_CALLTR_DST_RING_CNT		x: number of rings at destination of call transfer
005	56	NCU_CALLTR_SRC_RING_CNT		x: number of rings at source of call transfer
040	57	NCU_CALLTR_RING_INTERVAL	x*100ms	time between starting rings during call transfer
050	58	NCU_CALLTR_TIMEOUT	x*100ms	timeout for dropping handset to start call transfer
015	59	NCU_PABX_PREFIX		2 nibbles
104	5A	NCU_MACHINE_CODE		Philips (g1:0x61, G2:0x62) Ricoh(g1:0x13, G2: 0x14)
004	5B	NCU_EXT_DET_TIME		
030	5C	NCU_EXT_LOOP_LOSS		
020	5D	NCU_EXT_LOOP_ADD		
000	5E	NCU_FSW_TIM_RING1	x*100ms	time from start of first ringback to start of first ring
015	5F	NCU_TX_ATT_TONE		
000	60	NCU_TX_ATT_TAM_AUDIO_OGM		
000	61	NCU_USR_MEMO_FWD		used for config storage - do not change
001	62	NCU_FOIL_ID		x: 0x01.. PHILIPS, 0x02.. RICOH (0.. check disabled, 0xff .. enabled, but check always OK)
000	63	NCU_LNG_OPT0		x: 0..GB, 1..D, 2..DK, 3..E, 4..F, 5..I, 6..N, 7..NL, 8..PO, 9..S, 10..SF, 11..S2, 12..GB2, 13..H, 14..CZ, 15..F2, 16..SK, 17..PL, 18..NL2, 19..I2, 20..N2
001	64	NCU_LNG_OPT1		x: defines see NCU_LNG_OPT0
004	65	NCU_LNG_OPT2		x: defines see NCU_LNG_OPT0
255	66	NCU_LNG_OPT3		x: defines see NCU_LNG_OPT0
000	67	NCU_CLI_RING_ON_MIN	x*10ms	
130	68	NCU_CLI_RING_ON_MAX	x*10ms	
043	69	NCU_CLI_TIME_TO_IMP	x*10ms	
215	6A	NCU_CLI_TIME_TO_SYNC	x*10ms	
215	6B	NCU_CLI_TIME_TO_SEIZURE	x*10ms	
100	6C	NCU_CLI_TIME_TO_MARK	x*10ms	
000	6D	NCU_CLI_TIME_TO_DATA	x*10ms	
000	6E	NCU_CLI_TIME_TO_MESSAGE	x*10ms	
000	6F	NCU_CLI_LOOP_CURRENT	x*10ms	
020	70	NCU_CLI_SEIZURE_MIN		x*#bits:
003	71	NCU_CLI_SEIZURE_MAX_100		x*#bits*100:
050	72	NCU_CLI_SEIZURE_MAX_1		x*#bits:
085	73	NCU_CLI_SEIZURE_VALID		x*#bits:
055	74	NCU_CLI_MARK_MIN		x*#bits:
205	75	NCU_CLI_MARK_MAX		x*#bits:
035	76	NCU_CLI_V23_CARRIER_ON_LEVEL		x*DbM
000	77	NCU_CLI_MODE		x:
064	78	NCU_CLI_DEF		x:
010	79	NCU_CLI_TIME_TO_IMP_OFF	x*10ms	
001	7A	NCU_CLI_TIME_TO_START	x*10ms	
000	7B	NCU_CLI_TIME_TO_SILENCE	x*10ms	
000	7C	NCU_CLI_TIME_TO_ALERT	x*10ms	
004	7D	NCU_CLI_CARRIER_DROPOUT	x*10ms	
000	7E	NCU_CLI_TIME_TO_ALERT_END	x*10ms	
170	7F	NCU_CLI_TIME_TO_RING	x*10ms	
000	80	NCU_TX_ATT_TAM_AUDIO_ICM	x*10ms	
100	81	NCU_EXT_RING_DURATION	x*10ms	
000	82	NCU_CLI_DTMF_TIME_TO_ START		
000	83	NCU_CLI_DTMF_TIME_TO_ STOP		
000	84	NCU_CLI_DTMF_MAX_TIME		
000	85	NCU_CLI_DTMF_LEVEL		
000	86	NCU_CLI_DTMF_TIME_TO_POL_REV		
000	87	NCU_CLI_DTMF_BREAK_TIME		
003	88	NCU_CLI_PARAM		
000	89	NCU_CLI_MODE1		
005	8A	NCU_TX_ATT_TAM_LINE_ADJ		
020	8B	NCU_EMAIL_HOST_ RESPONSE_1		
030	8C	NCU_EMAIL_HOST_ RESPONSE_2		

val	Addr	NCU Name	Unit	Description
001	8D	NCU_EMAIL_NET_DIAL_DELAY		
037	8E	NCU_EMAIL_NET_DIAL_PARAM		
113	8F	NCU_EMAIL_CFG_MODE		
000	90	NCU_EMAIL_DUMMY1		
000	91	NCU_SCANNER_CONTRAST		contrast for printer (0x00=default, 0x01=dark, 0x02=light)
005	92	NCU_BC_DELAY_OFFLINE	x*1s	delay betweeen call attemps by broadcast
000	93	NCU_FSW_TOGGLE_MODE		current state of day/night and TAM on/off key; t.b.d
020	94	NCU_PARALLEL_ON_DET_ TIME	x*10ms	parallel onhook detection time
164	95	NCU_PARALLEL_OFF_DET_ TIME	x*10ms	parallel offhook detection time, parallel detection freeze time
020	96	NCU_PARALLEL_ON_LOSS_ TIME	x*10ms	parallel onhook loss time
000	97	NCU_PARALLEL		
003	00	LIU_DMODE		dial mode register
000	01	LIU_PULSE_MODE		bits: for LIU switch (0 means: in PSTN (PSTN/PABX pin =1, Loudness =0) in PABX (PSTN/PABX pin =0, Loudn. = 1)
085	02	LIU_INTER_DIGIT		in 10 ms inter digit delay
025	03	LIU_FLASH	x*10ms	flash time
020	04	LIU_ACCESS_PAUSE		in 10 ms - access pause time
010	05	LIU_DTMF_LEV_HIGH	in -dbm	level of high frequency
012	06	LIU_DTMF_LEV_LOW	in -dbm	level of low frequency
085	07	LIU_DTMF_ON	in ms	in ms - DTMF on time
085	08	LIU_DTMF_OFF	in ms	in ms - DTMF off time
040	09	LIU_PULSE_MAKE	in ms	in ms - PULSE MAKE time
060	0A	LIU_PULSE_BREAK	in ms	in ms - PULSE BREAK time
020	0B	LIU_RING_MIN_FRQ	HZ	in Hz - min. RING frequency
060	0C	LIU_RING_MAX_FRQ	HZ	in Hz - max. RING frequency
000	0D	LIU_PABX_DIFF	in -dbm	in 0.1 db - PABX output level adjustment
011	0E	LIU_COUNTRY_CODE		country code
011	0F	LIU_COUNTRY_BACK		backup of country code
010	10	LIU_PABX_FLASH	x*10ms	PABX flash time(0.. use same as NCU_LIU_FLASH, for DE 250ms is used)
048	11	LIU_DMO_MODE		x: country specific DMO-mode
025	12	LIU_EXT_RING_FRQ		ringer frequency for external ringer
	00	NCU_TONDET_TEL_PHASE		tones to be detected during outgoing call (TEL)
	01	NCU_TONDET_FAX_TX_PHASE		tones to be detected during fax sending (FAX)
	02	NCU_TONDET_TAM_PHASE		tones to be detected during incoming call and tam activity (TAM/ TEL)
	03	NCU_TONDET_TEL_ADD_BUSY		additional tones which should be detected as busy during outgoing call (TEL)
	04	NCU_TONDET_FAX_TX_ADD_BUSY		additional tones which should be detected as busy during fax sending (FAX)
	05	NCU_TONDET_TAM_ADD_BUSY		additional tones which should be detected as busy during incoming call and tam activity (TAM/TEL)
	06	NCU_TONDET_TEL_ADD_ ENABLE		additional tone enable which should be detected as busy during outgoing call (TEL)
	07	NCU_TONDET_FAX_TX_ADD_ENABLE		additional tone enable which should be detected as busy during fax sending (FAX)
	08	NCU_TONDET_TAM_ADD_ ENABLE		additional tone enable which should be detected as busy during incoming call and tam activity (TAM/TEL)
	09	NCU_TONDET_TEL_BUSY_ LEVEL	in dBm	dbm:additional (override) detection level for busy tones during outgoing call (TEL)
	0A	NCU_TONDET_FAX_TX_BUSY_LEVEL	in dBm	dbm:additional (override) detection level for busy tones during fax sending (FAX)
	0B	NCU_TONDET_TAM_BUSY_ LEVEL	in dBm	dbm:additional (override) detection level for busy tones during incoming call and tam activity (TAM/TEL)
	0C	NCU_TONDET_TEL_DIAL_ LEVEL	in dBm	dbm:additional (override) detection level for dial tones during outgoing call (TEL)
	0D	NCU_TONDET_FAX_TX_DIAL_ LEVEL	in dBm	dbm:additional (override) detection level for dial tones during fax sending (FAX)
	0E	NCU_TONDET_TAM_DIAL_ LEVEL	in dBm	dbm:additional (override) detection level for dial tones during incoming call and tam activity (TAM/TEL)
	0F	NCU_TONDET_ADD_DETECTION_TIME		
	10	NCU_TONDET_TONE1		country tone1 definition
	11	NCU_TONDET_TONE2		country tone2 definition
	12	NCU_TONDET_TONE3		country tone3 definition
	13	NCU_TONDET_TONE4		country tone4 definition
	14	NCU_TONDET_TONE5		country tone5 definition
	15	NCU_TONDET_TONE6		country tone6 definition
	16	NCU_TONDET_TONE7		country tone7 definition
	17	NCU_TONDET_TONE8		country tone8 definition
	18	NCU_TONDET_TONE9		country tone9 definition

val	Addr	NCU Name	Unit	Description
	19	NCU_TONDET_TONE10		country tone10 definition
	1A	NCU_TONDET_TONE11		country tone11 definition
	1B	NCU_TONDET_TONE12		country tone12 definition
	1C	NCU_TONDET_TONE13		country tone13 definition
	1D	NCU_TONDET_TONE14		country tone14 definition
	1E	NCU_TONDET_TONE15		country tone15 definition
	1F	NCU_TONDET_TONE16		country tone16 definition
	20	NCU_TONDET_DTMF_LEVEL		dbm: DTMF detection level
	21	NCU_TONDET_DTMF_ON_TIME	x*10ms	DTMF detection time
	22	NCU_TONDET_SILENCE_LEVEL	in dBm	dbm: Silence detection level
	23	NCU_TONDET_SILENCE_TIME	x*100ms	Silence detection time
	24	NCU_TONDET_SILENCE_WINDOW		x: window for measuring silence level(use 4,8,16 samples when Ncu val=1,2,3)
	25	NCU_TONDET_CNG_LEVEL	in dBm	dbm: CNG detection level
	26	NCU_TONDET_MODEM_PAR		
	27	NCU_TONDET_MODEM_PAR1		
	28	NCU_TONDET_MODEM_PAR2		
	29	NCU_TONDET_MODEM_NOISE0		
	2A	NCU_TONDET_MODEM_NOISE1		
	2B	NCU_TONDET_DETECTION_TIME1	x*1ms	country tone1 detection time
	2C	NCU_TONDET_DETECTION_TIME2	x*1ms	country tone2 detection time
	2D	NCU_TONDET_DETECTION_TIME3	x*1ms	country tone3 detection time
	2E	NCU_TONDET_DETECTION_TIME4	x*1ms	country tone4 detection time
	2F	NCU_TONDET_DETECTION_TIME5	x*1ms	country tone5 detection time
	30	NCU_TONDET_DETECTION_TIME6	x*1ms	country tone6 detection time
	31	NCU_TONDET_DETECTION_TIME7	x*1ms	country tone7 detection time
	32	NCU_TONDET_DETECTION_TIME8	x*1ms	country tone8 detection time
	33	NCU_TONDET_DETECTION_TIME9	x*1ms	country tone9 detection time
	34	NCU_TONDET_DETECTION_TIME10	x*1ms	country tone10 detection time
	35	NCU_TONDET_DETECTION_TIME11	x*1ms	country tone11 detection time
	36	NCU_TONDET_DETECTION_TIME12	x*1ms	country tone12 detection time
	37	NCU_TONDET_DETECTION_TIME13	x*1ms	country tone13 detection time
	38	NCU_TONDET_DETECTION_TIME14	x*1ms	country tone14 detection time
	39	NCU_TONDET_DETECTION_TIME15	x*1ms	country tone15 detection time
	3A	NCU_TONDET_DETECTION_TIME16	x*1ms	country tone16 detection time
	3B	NCU_TONDET_EXT_TEL_HALT_PHASE		
	3C	NCU_TONDET_RING_HALT_PHASE		

III Service

In this Chapter you can find

- illustrated disassembly
- PCB-architecture and descriptions
- troubleshooting
- technical data
- mechanical and electrical parts list
- glossary and index

7 DISASSEMBLY

Warning!
Disconnect the Power from the set before removing any cover!
Remove the ink-film from the set. Be aware that the detachable scanner is on a save area

7.1 OPU

7.1.1 Remove OPU

1. Remove scanner (fig. 1a), handset, paper tray ,open the fax set and remove Ink Film.
2. Push open 3 snaps starting in the right side (fig. b). OPU slightly opens (fig c.). Hold and press middle, then left snap.
3. *Hold OPU carefully until all the snaps are free.*
4. Lift the OPU carefully and disconnect cables. (see fig. 1d) (Screws: torque size 8)

fig. 1a

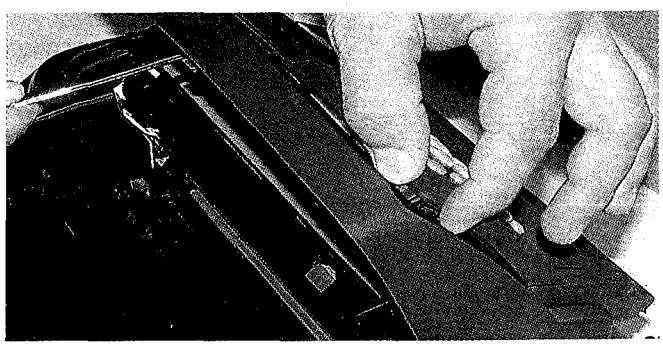


fig. 1c

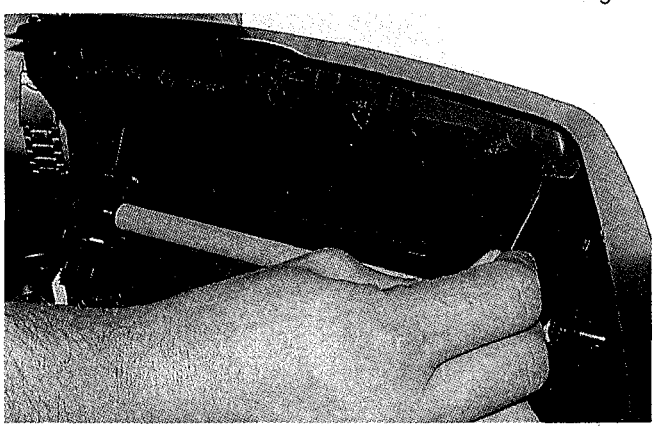


fig. 1b

fig. 1d

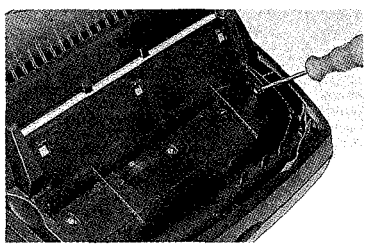


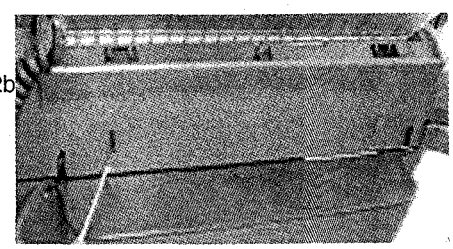
fig. 2a

7.2 BACK COVER

7.2.1 Remove back cover

1. Remove OPU. Remove Screws (see fig 2a)
2. Open snaps in the back (see fig 2b)
3. Open the fax set. Remove carefully the cover.

fig. 2b



7.2.2 HANDSET COVER

Remove Handset Cover

1. Remove all accesories.
2. Open the fax set
3. Remove the screw from the cover. (see fig 3a)
4. Push in the snap in the back to the side. (see fig. 3b)
5. Lift the handset cover towards the left. Remove carefully

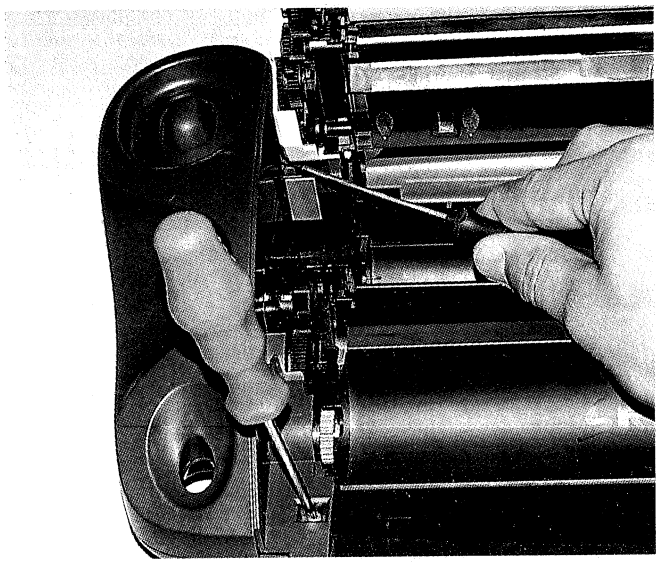


fig. 3a

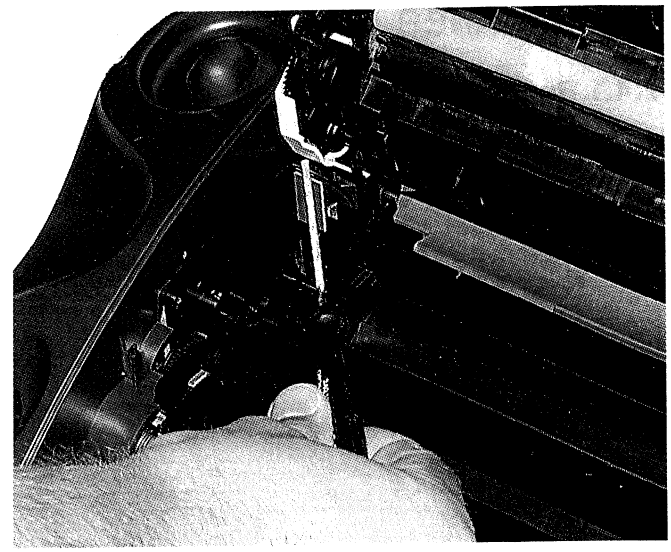


fig 3b

7.3 PICK UP MODULE + PRINTER MODULE

7.3.1. Remove the Pick up Module

1. Remove all accesories.
2. Remove rear cover (if neded see section 7.1)
3. Remove Handset cover (see section 7.2.2)
4. Remove the 5 screws in the bottom of the Printer Module (see fig 4a)
5. Open the Snap and lift Module
6. Disassable the HSB
7. Disconnect the PGU, GND and LS
8. Remove Module
9. Close carefully the Pick up Module. Remove towards the back. (see fig 4b)
10. Disconnect THP, SIF sensor, motor, SSP sensor, door switch.

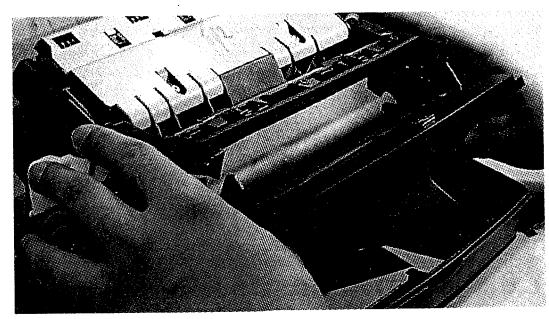


fig. 4b

fig. 4a

7.4. SCANNER MODULE

7.4.1 Remove ECB

1. Remove the handset, tray and Ink Foil.
2. Remove Tel. cover and Mech. Mod. module
3. Turn the pick module over, remove the screw from the ECB
4. Disconnect cables from the ECB. Set the board in a save place

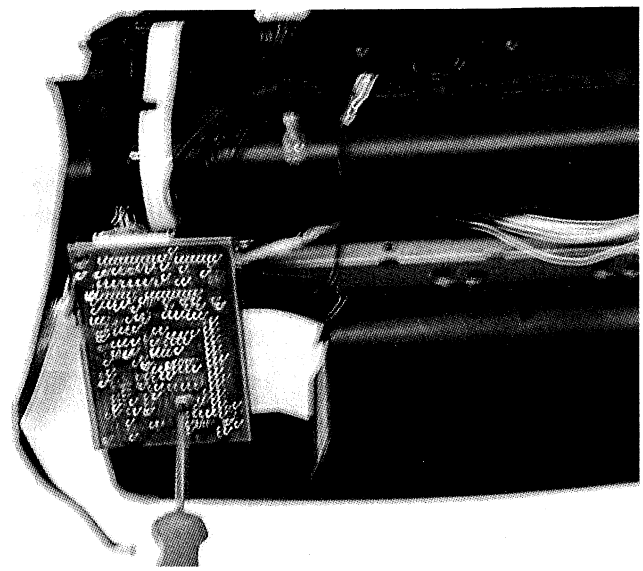


fig. 5

7.5 POWER GENERATOR UNIT

7.5.1 Remove PGU

1. Remove the handset, tray and Ink Foil
2. Remove Tel. cover, Pick up module and Scanner Module
3. Remove the screws that secure the PGU (2 on upper side / 2 on bottom side)
4. Lift and remove Power cable - 6p. (see fig 6)

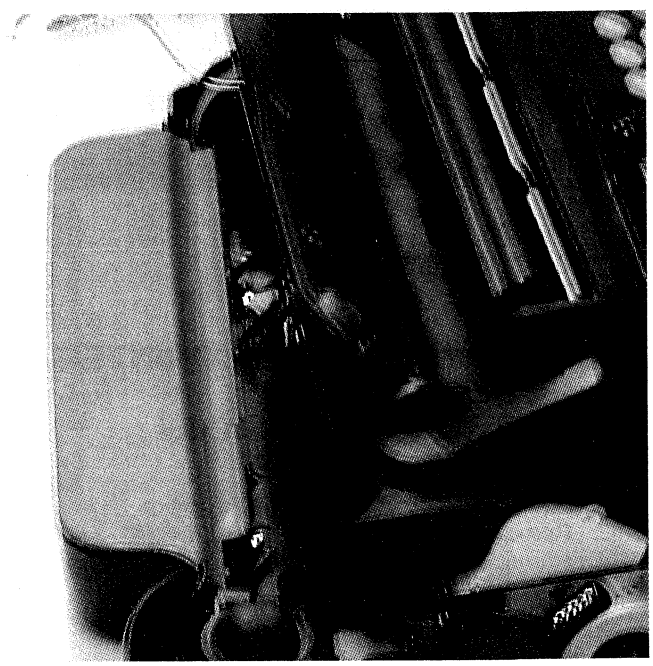


fig. 6

7.6 SCANNER UNIT

7.6.1 Remove Scanner Unit

1. Remove handset, tray and Ink Foil.
2. Remove Scanner unit from the set
3. To remove the unit completely, it has to be disconnected from the ECB
4. Open the set and remove the 5 scews on the bottom of the module. See fig. 3.c - 7.2.2
5. To open the PCB compartment, remove the scews in the bottom of the set. See 7.9
6. Disconnect the scanner cable from the ECB

7.7 ADF

7.7.1 Remove ADF

1. The ADF is extreme durable. It is not necessary to changed it so often. Though if necessary can be done
2. The ADF is localed in base of the detachable scanner holder
3. To remove it, is necessary to remove the back cover and the 2 screw from the Scanner holder.
   It is NOT recommended to change the ADF. Is part of the Mechanical Assy

7.8 THERMAL PRINTER HEAD

7.8.1 Remove TPH

1. Remove the handset, tray and Ink Foil.
2. Remove module. Disconnect cables carefully.
3. Turn the module over. You can see the back of the TPH
4. Press carefully on the safeties on the sides of the TPH. Use flat screwdriver.
   Take in account that the TPH is connected to the main Gear!! start on the oposite side
5. Release the TPH hinges at the sides of the TPH, by pressing carefull to the side

NOTE: When replacing the TPH,
NEVER PRESS ANYWHERE IN THE CENTER OR THE THERMAL HEAD. This can cause permanent damage to the Head.

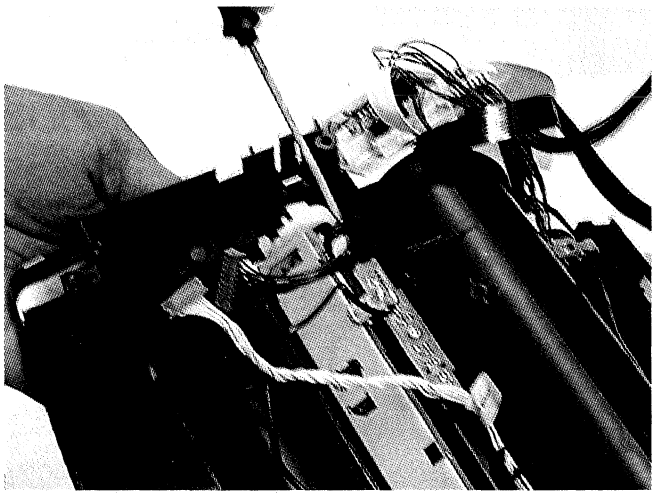


fig. 8a

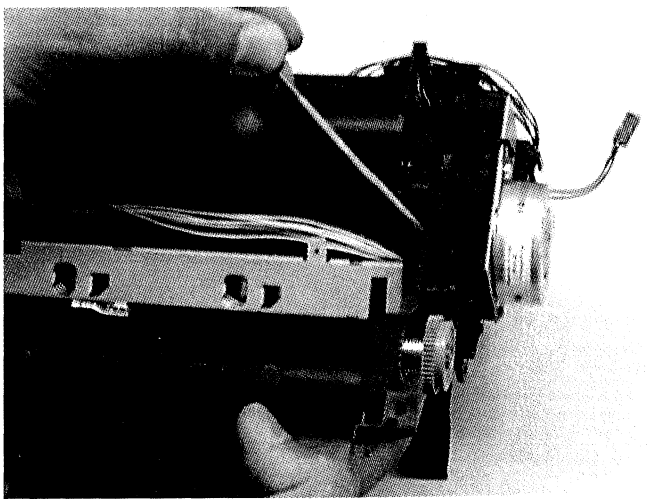


fig. 8b

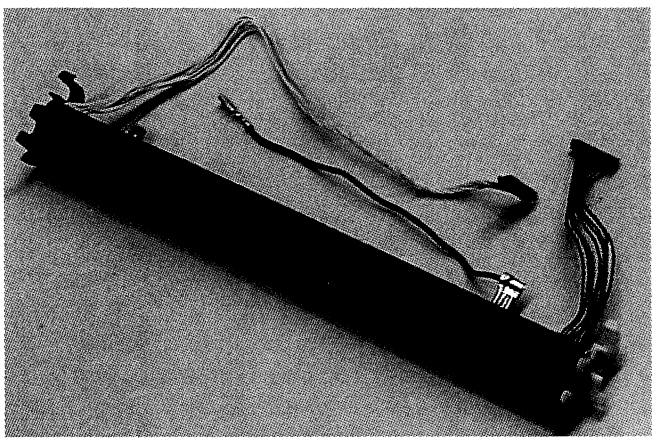
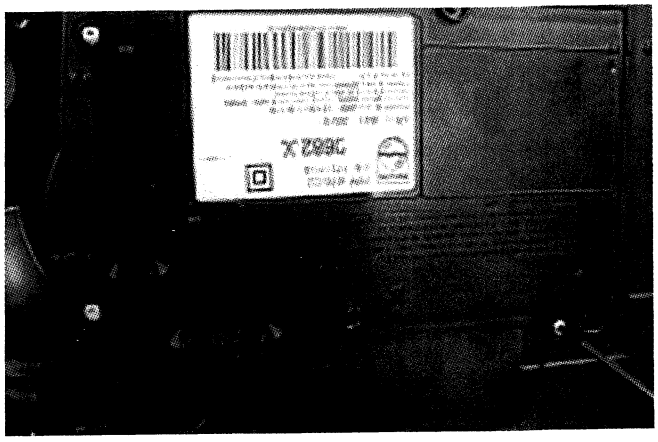


fig. 8c

7.9 LIU - FCU

7.9.1 Remove Printholder

1. Turn the fax set over.Remove the 3 screws in the bottom of the fax set.
2. Open the uper and lower snap of the cover.
3. Carefully open towars the right side. (see below)

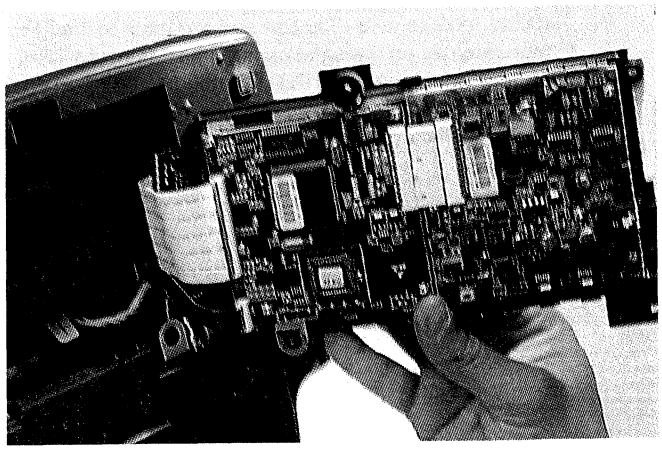


7.9.2 Remove FCU and LIU

1. LIU: remove the 4 screws.
2. Disconnect the flat cable from LIU-FCU

3. FCU: remove the 4 screw
4. Disconnect the all cables from FCU

USE ALWAYS THE SAME TYPE OF SCREWS AND THE SAME POSITIONS:



8 ARCHITECTURE

8. 1 FCU BOARD DESCRIPTION

The FCU is the digital board of the fax machine which controls all other modules like OPU, LIU, Sensors and the mechanical engine.

Feature List

- Fax core (CPU + Codec) based on TOSHIBA T7E38, TC35162, TC35133
- Program memory: OTP (512K x 8)
- SRAM (32K x 8), max 128Kx8
- Serial -Flash 4 MBit (8 Mbit in SG17)
- 9600bps Modem
- Scanner interface
- Serial interface to OPU
- Flexible interface to LIU (prepared for special features)
- Stepper motor driver
- Thermo print head interface
- Monitor control logic
- Loudspeaker amplifier
- Clock generation
- Digital volume control
- TPH temperature control
- Error diffusion (TC35162 only)
- Serial interface to feature connector board
- RTC with backup (goldcap)

Interface description, connectors
The number of connectors is reduced, since most of the connectors are now located on the ECB.

P403 - OPU connector

Pin No.:	Signal name	Direction	Level	Description
1	VCC	Out	Power	Power supply
2	DGND	Out	Power	Power supply
3	OPUSTR2	Out	CMOS	Latch signal for shift register
4	OPUSTR1	Out	CMOS	Latch signal for shift register
5	OPUOD	Out	CMOS	Data out
6	OPUID	In	CMOS	Data in
7	DGND	Out	Power	Power supply
8	OPUCLK	Out	CMOS	Clock for shift register

P404 - LIU connector

Pin No.:	Signal name	Direction	Level	Description
1	CURMOD	Out	CMOS	DC current adjust
2	SGP	In	CMOS	Not used in Supergalileo
3	MUTE	Out	CMOS	Handset mute
4	PSTN/PABX	Out	CMOS	Impedance setting
5	PAR_IND	In	TTL	Parallel indication
6	LOOP	In		Loop detection (LOW = -0.7V)
7	LOCLOOP	In	OC	Local loop detection
8	PD	Out	CMOS	Pulse dialing
9	HOOK	Out	CMOS	On hook relay
10	RING	In	OC	Ring signal
11	DGND Power	Out		Power supply
12	VCC Power	Out		Power supply

13	SNDGAIN	Out	CMOS	Adjust send gain
14	CDCTX	Out	Analog	Transmit signal
15	CDCRX2	In	Analog	Receive signal 1
16	DGND	Power	Out	Power supply
17	CDCRX	In	Analog	Receive signal
18	L-5V	Power	Out	Power supply filtered
19	L+5V	Power	Out	Power supply filtered
20	FSW1	Out	CMOS	Fax switch setting
21	FSW2	Out	CMOS	Fax switch setting
22	LOUDNESS	Out	CMOS	Acoustic setting
23	RNGS	Out	CMOS	Ringer
24	VLINE-	In	TTL	Polarity detection
25	CID_IMP	Out	CMOS	Select caller id impedance
26	VLINE+	In	TTL	Polarity detection
27	+24V	Power	Out	Power supply

P510 - ECB connector

Pin No.:	Signal name	Direction	Level	Description
1	TM	In	Analog	Thermistor of TPH
2	STB1	Out	CMOS	Strobe 1 for TPH
3	STB2	Out	CMOS	Strobe 2 for TPH
4	LATCH	Out	CMOS	Latch signal for TPH
5	+24V	In	Power	+24V supply voltage
6	24V-On	Out	OC	Driving signal for +24V switch on ECB
7	VCC	In	Power	+5V supply voltage
8	CLKTPH	Out	CMOS	Clock signal for TPH
9	DGND	In	Power	Ground
10	PFAIL	In	OC	Power fail signal
11	DI	Out	CMOS	Data in for TPH
12	STB3	Out	CMOS	Strobe 3 for TPH
13	STB4	Out	CMOS	Strobe 4 for TPH
14	SGP	In	OC	Sensor gear position
15	PSAVE-VCC	Out	Driver	Driver signal switch for +5V
16	SPS	In	OC	Sensor paper stock
17	ADF	In	OC	Sensor automatic document feeder
18	SDI	In	OC	Sensor document in
19	SPP	In	OC	Sensor paper in place
20	SIF	In	OC	Sensor ink foil
21	DGND	In	Power	Ground
22	LS+	Out	Analog	Loudspeaker
23	PHA	Out	CMOS	Stepper motor phase A
24	PH-A	Out	CMOS	Stepper motor phase B
25	PHB	Out	CMOS	Stepper motor phase C
26	PH-B	Out	CMOS	Stepper motor phase D
27	LEDON	Out	CMOS	Driver signal for switch scanner LED-bar
28	CRADLE	In	OC	Mechanical hook switch
29	-5V	In	Power	-5V supply
30	SVIDEO	In	Analog	Scanner video signal
31	PSAVE-CIS	Out	CMOS	Driver signal for switch +5V scanner
32	SLSY	Out	CMOS	Scanner sync signal
33	SC-SYNC	In	TTL	Scanner sync signal
34	DGND	In	Power	Ground
35	SCLK	Out	CMOS	Scanner clock signal

P431 -FBC connector

Pin No.:	Signal name	Direction	Level	Description
1	VCC	Out	Power	Power supply for feature box
2	TxD	Out	CMOS	Transmit signal UART
3	RxD	In	CMOS	Receive signal UART
4	DGND	Out	Power	Power supply for feature box
5	+24V	Out	Power	Power supply for feature box

Kernel

The kernel of the system is a two chip solution (three chips for full duplex handsfree functionality) from TOSHIBA. It consists of a CPU and controller IC (IC301) including DSP for modem functions and CODEC Chips (IC302, IC303) for A/D, D/A conversion and the analog front end.

Memory

The memory block consists of an OTP (IC305), a SRAM (IC306) and a serial Flash IC307. The serial Flash is used for speech storage and for page memory. In SG17 a 8Mbit Flash is used, 4Mbit are reserved for the buffer of the detachable scanner. Furthermore user programmable data (names, numbers, settings,..) are stored in the serial FLASH.
The bus width is 8-bit, ROM size is 512Kx8, SRAM size is 128Kx8 and a serial Flash with a size of 4MBit (8 Mbit for SG17) for TAM solution.

Clock generation

There are three oscillators to drive the system. First the modem frequency of 20.736MHz (for T7E38) and 14.4MHz (for TC35162), the 16Mhz for the CPU and the 32kHz oscillator for the RTC which operates also during power fail.

Reset circuitry

To overcome the problem of short power leakages a reset IC is used (IC304), which generates a reset signal as soon as the VCC voltage drops below 4.75V. This ensure a correct startup of the machine after that failure condition.

Scanner interface

The scanner interface consists of an internal and an external part. Externally the video signal goes through a buffer and filter circuitry and passes a clamp circuitry (TS301) to set DC-level to a defined value for each line.
Internally is an additional clamp and a sample and hold circuitry. Then the video signal comes to the A/D converter. The buffer amplifier was moved to the ECB.

The interface consists of the following signals:

Signal name	Direction	Level	Description
SCLK	Out	CMOS	Scanner clock
SLS	Out	CMOS	Scanner line start signal (Sync)
CLAMP	Out	CMOS	Start clamping
SVIN	In	Analog	Video signal from scanner

Printer interface

The printer interface is a standard interface to a thermal print head. There are only some R-C filters to avoid EMI on the connector.

The +24V for the TPH can be switched under software control. For security reasons an AC-signal must be applied at the TPHON to switch the voltage on. Any DC level at this pin will switch off the +24V.
So in case of a hardware damage of the core the +24V is switched off, which puts the TPH again in a safe operation mode, even if the Strobes of the TPH are still LOW.

The AC-signal must be in the range 100-800Hz with a HIGH level time between 50-300us, preferred values are 400Hz and 100us.

Signal	name	Direction	Level	Description
CLKTPH	Out	CMOS	Clock signal	
LAT	Out	CMOS	Latch signal	
STB1	Out	CMOS	Print strobe for 1st quarter of TPH	
STB2	Out	CMOS	Print strobe for 2nd quarter of TPH	
STB3	Out	CMOS	Print strobe for 3rd quarter of TPH	
STB4	Out	CMOS	Print strobe for 4th quarter of TPH	
DI	Out	CMOS	Data output (serial) to TPH	

Stepper motor interface

For driving the stepper motor a ULN2003 driver IC is used. This driver supports stepper motors with +24V / 200mA max of unipolar type. This driver IC is also located on the ECB.

Signal	name	Direction	Level	Description
MO0	Out	CMOS		Stepper phase 1
MO1	Out	CMOS		Stepper phase 2
MO2	Out	CMOS		Stepper phase 3
MO3	Out	CMOS		Stepper phase 4

OPU interface

The OPU is connected to the FCU by a serial interface, which is mainly supported by hardware in the fax core. For a detailed signal description please refer to the connector descriptions and the according data sheets of the fax core.

Modem interface

In Supergalileo design all the filters and amplifiers necessary as the analog front end are located on the LIU.
The analog signals from the LIU are connected to the CODEC(s), where the analog signal is converted to digital (refer to TC35133 specification).

Real time clock

In Supergalileo the built-in RTC is used, the backup is done by a goldcap. The backup time depends on the capacity of this capacitor, an estimation is shown below:

Goldcap	Backup time [hours]
0.1F	7
0.47F	35
1F	70

In case of power fail the voltage on the gold cap drops, the function of the RTC is guaranteed down to +2V.
During power up-sequence the output of the comparator IC403 determines if the voltage was below +2V or not. In case of total power loss the RTC must be reinitialized, that means the customer has to reenter time and date.

Microphone amplifier (for machines with TAM or handsfree function)

For TAM features a microphone amplifier with AGC is implemented. This circuit is located on the LIU.

Loudspeaker amplifier

The output amplifier for the loudspeaker is built around IC401 and TS401,TS402. Analog sources for this amplifier are RxD, TxD and the key beep signal. This sources can be selected under software control.
A digital volume control (IC402 and resistors) is used.
In general only three loudness levels are available and a complete mute. For ringing 3 levels are available, the level for the key beep is fixed.

Power save function

For the power save mode two switches are available. One switch (TS503) drive the supply of the CIS, the other one (TS502) the supply of the sensors.
In power save mode the sensors and CIS is switched off and the CPU enters a standby mode. Periodically the CPU starts up again for a very short period and check the OPU for pressed keys, the LIU and the sensors.
If there was no interaction of the customer or an incoming call the CPU enters sleep mode again.
With this method the average power consumption is much lower than in normal operating mode, resulting in an excellent low power consumption on mains during stand by mode.

Sensor interface

A lot of different sensors are necessary, please refer to the connector description for further details:

SDI	-	Document in sensor
SPP	-	Paper in position
ADF	-	Automatic document feeder
SIF	-	Ink film detection
SPS	-	Paper stock sensor
SCO	-	Cover switch
SGP	-	Gear position

Scanner workaround

For machines with TC35162 a NOR-gate (IC502) is mounted on the PCB. This is a workaround for CIS in the power down mode. In that case the VCC is switched off, whereas the levels on SLS and SCLK are still HIGH. That means the CIS is supplied over the input signals, which may cause a latch-up problem. The NOR-gate allows the software to force this levels to LOW.
For T7E38 this gates are already integrated in the fax core.

EMC countermeasures

There are a lot of components on the PCB for reduction of EMI. This is necessary, because very high frequencies (57.6Mhz modem clock) must be filtered so that no noise can leave the PCB via the connectors and cables.

On the other hand very critical and small analog signals (Modem, scanner) on the PCB must have low noise and a good S/N ratio.

For that reason special care has been taken in the PCB layout and for the decoupling. First of all all supply pins are decoupled by at least one capacitor. Analog supply voltages are decoupled with L-C networks. Critical signal lines use RC-Networks and all digital lines which leave the PCB via a connector are additionally decoupled by a capacitor.

8.2 LIU Description Introduction

The LIU is the interface between the FCU unit and the telephone line. The design concept can be characterized as follows: The complete device which is connected via the LIU has a galvanic telephone ground connection. This leads to some extraordinary simplifications:

- a simple high voltage protection
- no modem transformer
- no optical decoupling to main circuitry
- An expensive current sensor is replaced by a cheaper resistive current measure method
- TAM recording can be done via handset
- No Telephone IC is used, all functions are realized with OPVs

Features

- loop detection
- 2nd line plug
- hook switch relais
- ring detection (low/high sensitivity)
- modem interface
- pulse / tone dialling
- CNG detection
- Microphone path for TAM/Handsfree
- country switching for 600 countries
- adjustable rec. volume
- sending speech mute
- active fax switch
- parallel phone detection
- caller identification support
- support for DFS function
- french current regulation

LIU /FCU Interface Concept

The interface concept provides interfacing to ToshibaCore to the new PCB concept of Supergalileo

Description of Interface Signals

P804 (FCU Connector)

Signal positions correspond to LIU connector (signals in bold are different to Galileo LIU)

Name of Signal	Pin	Direction	Value typ.	Misc. Description
+24V	1	input	+24V	max. 250mA necessary for ring generator.
VLINE+	2	output	TTL	high if Vline > 30V
CID_IMP	3	input	TTL	switches CID impedance to line
VLINE-	4	output	TTL	high if Vline < -30V
RNGS	5	input	TTL	switches ring sensitivity
LOUDNESS	6	input	TTL	gain attenuator for rec level handset
FSW2	7	input	TTL	= ring frequ. Switches ring generator on (pulsed)
FSW1	8	input	TTL	switches local loop relay
VCA	9	input	+5V	pos. Supply analog
-5V	10	input	-5V	neg. supply
MRXD	11	output	-6 dBm	max. modem receive path
DGND	12	input	ground	
MIC	13	output	0 dBm	max. microphone handset output
MTXD	14	input		modem send
SNDGAIN	15	input		gain attenuator snd level handset
VCC	16	input	+5V	digital pos. Supply
DGND	17	input		ground
RING	18	output	TTL	ring signal output
HOOK	19	input	TTL	switches hook relay, high = online
PD	20	input	TTL	pulse dial , high = make
LOCLOOP	21	output	TTL	low if local loop current
LOOP	22	output	TTL	low if line current > 10mA
PARIND	23	output	TTL	dynamic parallel indication
PSTN/PBX	24	input	TTL	switches AGC, high = ON
MUTE	25	input	TTL	high = modem path enabled
SGP	26	output	TTL	high = switch open
CURMOD	27	input	TTL	control input for current modulation

LIU / New Functions

Ø **VLINE+** ***(pin2, P804),*** **VLINE-** ***(pin4, P804)***

These two signals combine the polarity detection and the static parallel detection. The modification was necessary to support the DFS (Distributed Fax Switch) and to realize a symmetrically functioning polarity detection.
See chapter 2.5.7.1 for detailed description

Ø **SNDGAIN** ***(pin15, P804)***

This pin controls sending gain of the microphone amplifier. See description in chapter 2.5.13

Ø **RING** ***(pin 18)***

This signal is now only for ring detection. There is no combination with the local loop current detection (AFS)

Ø **LOCLOOP** ***(pin 21)***

This signal goes to low if the local loop is seized. If a local ring is generated this signal might toggle.
The function is similar to the one of Galileo it has only a dedicated signal pin. The advantage of this seperate detection of the local loop current is the insensitivity to incoming rings (problem with Galileo LIU)

Ø **PARIND** ***(pin 23)***

This signal is meant for a dynamic parallel phone detection after the fax itself is already offhook. hook or for DFS data reception. For a detailed description see chapter 2.5.6.

Ø **CURMOD** ***(pin27)***

If CURMOD goes high the DC characteristic of the line interface is moved to higher currents. This feature can be used for DFS signalling if necessary. This current modulation shall work in a way that the dynamic parallel detection in all other DFS units within the network react on these signals. **If necessary, this signal can be used for the DMO functionality as well (must be forseen in Italy, for excample)**

Ø **DMO**

The signal DMO is, as mentioned above, realized with the signal CURMOD.

P813 (Handset Connector)

Name of Signal	Pin	Direction	Description
MIC-	1	input	mouthpiece microfone, (symmetrical input)
EAR-	2	output	earpiece speaker, (connected to AGND)
EAR+	3	output	earpiece speaker
MIC+	4	input	mouthpiece microfone, (symmetrical input)

P812 (Line In Connector)

Name of Signal	Pin	Direction	Description
LA	3	input	tel.line in
LB	4	input	tel line in
LA2	2	output	tel line out,(local loop)
LB2	5	output	tel line out, connected to local loop in idle mode
NC	1		
NC	6		

P811 (Line Out Connector)

Name of Signal	Pin	Direction	Description
LA2	3	output	tel line out, connected to local loop in idle mode
LB2	4	output	tel line out, connected to local loop in idle mode

P838 (Mic Connector for POTS One piece phone)

Name of Signal	Pin	Direction
MIC+	1	input
MIC-	2	input

Circuit description

Line Connection, Filtering

The connection of the PSTN to the unit is done via the connector P812.
After the protection devices SA801,R785, R786, D801 (240V) and the line filter L802 the signal goes to the hook switch relay RY801. The tax pulse filter (for CH, D) is built around L803, L804, L805 and can be adjusted for 10kHz and 16 kHz. After this the polarity of La,Lb is fixed by the rectifier D806, D807.
J831 can be removed for UK approval to fit in the outband noise filter coil. For the italian assembly version OC801 is used to detect the line current due to the fact that b and b2 is short circuited in the italian PTT line wall plug. C801 and C802 are important for E MC and also for line balance adjustment.
The jumpers J832 to J835 can be used for different connection methods of the two line plugs (parallel / serial)
Active Fax Switch / Ring Generator

The line out connection La2, Lb2 is available at p812 and p811. In idle mode (also during power save) the relay RY802 is activated so that La2, Lb2 is connected to the local loop feeding, that means that there is no connection between La and La2 or Lb and Lb2 in idle mode. This makes it possible that an external serial phone does not ring at an incoming call. The local loop feeding and ring generation is realized by IC750 and all surounding components.In idle mode La2, Lb2 is connected between 24V via R751, L750, D750, R761 and the current sensing resistor R918 and ground.The signal LOCLOOP is derived from the voltage across R918 (see detailed description below) The input signal FSW2 (P804) has to be pulsed (protection circuit around TS754) to produce a DC voltage of about 150V via IC750. This IC is a step up converter which switches with 50 kHz. FSW2 is switched with 20 Hz to 50 Hz (corresponding to country dependent ringer frequency) so that a rectangular ringer signal is generated at ROUT. TS751 and TS753 short circuit the output voltage at ROUT to +24V at the same time as FSW2 becomes low. Since some cordless phones do not react on rectangular ring signals, the generated signal is shaped by a passive R-C-network.

Pulse dialling circuit

The FCU controls the interrupter transistor TS803 via TS806. If the signal PD is high the loop is closed. The same FET is used for the french current limiting DC loop circuit.

Ring Detection

The ring signal is decoupled via C808, divided by R906/R907 and R805/R911 and produces a TTL signal via TS805. TS 804 connects R910 in parallel to R805/R911 to provide to steps of sensitivity.
RNGS = HIGH -> low sensitivity. The whole circuit is high impedant to keep the influence on pulse dialling distortion minimal The additional network defines the ringer impance (necessary for DE). This network is disconnected if HOOK = HIGH. The zener diodes D817, D818 provide a voltage fall off if AC impedance is measured with high voltages.

Caller Identification Impedance Setting

If required a special impedance can be connected to a,b via TS971. The impedance is set by C812, C798, R792, R793 and R794. I/O signal state necessary for CLIP state:

signal	state
HOOK	H
PD	L
CID_IMP	H

Dynamic Parallel Indication

This signal is meant for a dynamic parallel phone detection after the fax itself is already offhook. The circuitry is connected at R817 which defines the DC loop current. The circuit detects a current drop which results from a parallel phone off hook. This detection reacts on all current drops happening at the ptt line, thus the PARIND signal shall only be enabled in special states like detection of a parallel phone after the fax is already off hook. A miss detection due to voice signals is sufficiently suppressed by a low pass filter.

Polarity Detection / Static Parallel Phone Detection

The signals VLINE+ (pin 2, P804), VLINE+ (pin4, P804) combine the polarity detection and the static parallel detection.

This detection works only if the fax is on hook and not in CLIP state. Thus, to detect a polarity reversal during clip state is still not possible.

Loop Detection

Two loop detection circuits are necessary. One is used to detect if the line interface itself is online and if an external phone is online while the activ fax switch is disabled. The loop detection cicuit is built around IC802. It detects if an external serial phone takes the line. The signal LOOP is low in case of loop current. TS808 and TS809 are necessary for a symmetrical detection of ext. line current (EXTLOOP can have both polarities).
If the active fax switch is enabled local loop is detected via Pin 21 of P804.
The italian version of the loop detection uses the coupler OC801 to provide potential free current measurement.

Speech circuit and line impedance setting

The Sidetone suppression is done by the modem 2-4 wire hybrid around IC801. The amplifier for the mic and the loudspeaker are also included in IC801. With IC 804 the gain of both directions can be adjusted. An AGC with two steps is realized with TS810, TS812 and the corresponding control circuit.

DC Current Setting

DC Current is defined by the gyrator circuit around TS806. An adjustment is possible with R819 and R818.
A current regulation for France is possible with TS817. In this case a heat sink is necessary for TS806

Impedance setting

The DC decoupling is done by C821, the set impedance is defined by R866, R867, C842 and C916.

EMI and Protection Components

The line input is protected by SA801, R785, R786 and D801.
Around IC801 there are several components for this aim:
D812, D813, D825, D815 protect IC801 against high voltages. C811, C851, C831, R923, C810, C827, C828, C856, C857, R884, R885 prevent demodulation effects.

Modem Path

The interface between the telephone line and the fax core is made by the circuit around IC801 and IC802. These two opamps make a two-four wire conversion and local echo cancelation. A complex network is necessary to match the country dependent line impedance which is also used for sidetone suppression

Country Switching

This LIU provides the possibility to cover several country requirements by one assembly version. This is possible for the countries A, B, NL, E, P, SF and the international version. These countries require a 600 Ohm line impedance setting.
Only acoustic matters and ringer sensitivity are different.
The signal LOUDNESS controls the gain of the receiving volume (only handset, not handsfree).
The signal AUX1 controls the gain of sending volume (microphone amp for handset, no influence on handsfree)
The signal PSTN/PABX switches AGC on and off. If activated the sending and receiving gain is increased to compensate line loss. This setting depends on specific countries. (The table below will be extended)
For Italy and France the signals LOUDNESS, AUX1, PSTN/PABX shall be combined with the PSTN/PABX user functions. Besides this all these settings are fixed for one country under all functional states.
not fixed !!! (at the moment of editing this manual)

Signal	A	B	NL	E	P	SF	INT
LOUDNESS	L	L	H	L	L	H	H
RNGS	L	L	H	L	L	L	L
AUX1							
PSTN/PABX	L	H	L	H	H	L	L

Volume Control at FCU

The three output signals from the fax core VOL1, VOL2, VOL3 control ringer and voice loudness from the loudspeaker. The settings are valid for both fax cores.
The low level setting for ringer volume shall be used for the key click volume.

State	VOL3	VOL2	VOL1	OUTP
Line Monitoring	L	L	H	1
Ringer high	H	H	H	7
Ringer medium	H	H	L	6
Ringer low	H	L	H	5
Voice high	H	L	L	4
Voice medium	L	H	H	3
Voice low	L	H	L	2
Mute	L	L	L	0

Specification of I/O Signals

Required Input Signal States (output signals from FCU)

Signal	Power Up	On Hook (AFS on)	Off Hook (voice)	Off Hook (data)	CLIP State
CID-IMP	L	L	L	L	H
RNGS	country dep.	country dep.	country dep.	country dep.	country dep.
LOUDNESS	country dep.	country dep.	country dep.	country dep.	country dep.
FSW2	L	L	L	L	L
FSW1	L or H	H	H	H	H
SNDGAIN	country dep.	country dep.	country dep.	country dep.	country dep.
HOOK	L	L	H	H	H
PD	L	L	H	H	L
PSTN/PABX	country dep.	country dep.	country dep.	country dep.	country dep.
MUTE	L or H	H	L	H	H
CURMOD	L	L	L	L	L

LIU I/O Signals for Basic Function (On / Off Hook)

The following tables defines all output signals at the connector P804 which are described within the timing diagramms in the following chapters.

Signal out	OH, no ring	Off Hook
PAR_IND1	L	H
POL_REV	polarity dep.	same pol. as in oh state
RING	H	H
LOCLOOP	H	H
LOOP	H	L
PARIND2	H	H

Signal in	OH, no ring	Off hook
CID_IMP	L	L
FSW2	L	L
FSW1	H (if AFS activ)	H
HOOK	L	H
PD	L	H
MUTE	L	L

9 TROUBLE SHOOTING

9.1 SERVICE REPORT

The service report (function 72) is a listing of the most recent (10) error codes and gives information of the (5) most recent communications that experienced errors. The Error code column indicates communication errors:

1. Enter the service function (see section 7.3).
2. Press ENTER - The Service report list will be printed now.

SERVICE REPORT

TIME	ERR.CODE	REMOTE MACHINE	TX/RX	PAGES	SP	RESOL.	CODING
	04		R	0			
	04		R	0			
	42						
	04		R	0			
	40	4316010112345	R	1	96	STANDARD	MR
	31	4316010112345	R	2	96	STANDARD	MR
	40						
	06	4875	T	1	96	STANDARD	MR
	04		R	0			
	06	4316010154321	T	1	96	STANDARD	MR
	42						
	06	4316010112345	R	2	96	FINE	MR
	06	4172	T	0			

Position	Description
TIME	DATE AND TIME
ERR. CODE	SEE SECTION
REMOTE MACHINE	NOT AVAILABLE THE CALLED TELEPHONE NUMBER
TX/RX	TX = TRANSMIT, RX = RECEIVE
PAGES	NUMBER OF PAGES TRANSFERRED IF TRANSMISSION OCCURED
SP	TRANSMISSION SPEED (9600,7200,4800 OR 2400 BPS)
RESOL.	RESOLUTION (STANDARD/FINE/PHOTO)
CODING	MR OR MH

9.2 ERROR CODES

Nr.	Error message	Description	Action
00	FAX OK	Transaction was succesfull	None
01	PICT. QUALITY	The transmitted or received picture quality was unacceptable	Check line connection. The other machine can be incompatible. Send to another machine.
02	TIME OUT	The remote machine gave no answer within the specified time	Check line connection. The other machine can be incompatible. Send to another machine.Adjust output evel.
03	DCN RECEIVED	The remote machine terminated the communication. Possibly TX rejected	Other machine is out of paper, has a paper jam or STOP was pressed during the transaction
04	LINE DISCONNECT	An expected command has not been received. Possibly the line was disconnected	Check line connection. The other machine can be incompatible. Send to another machine.
05	NO RESPONSE IN ALL TRIES	The receiver did not reply the third training signal or the pixel message (receive quality unknown)	Check line connection. The other machine can be incompatible. Send to another machine. Adjust output level. Exchange FCU - LIU
06	ABORTED	The TX was aborted through the STOP key or by irregular circumstances	Info only
08	3 ID RECEIVED WHILE WAITING FOR CFR	The remote receiver did not understand our answer to its ID	Check line connection. The other machine can be incompatible. Send to another machine. Adjust output level. Exchange FCU - LIU
09	FALL BACK IMPOSSIBLE	It was not possible to send or received an acceptable training signal	Check line connection. The other machine can be incompatible. Send to another machine. Adjust output level. Exchange FCU - LIU

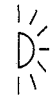
Nr.	Error message	Description	Action
10	ABSOLUTELY NO LOCAL RESPONSE FROM REMOTE INTERRUPT	The remote machine issued a voice request, but the local operator did not respond	Check SW settings, try to send to another machine. Adjust out put level and/or sensitivity
11	LINE BUSY	Busy tone detected during fax communication	Control the line. For PABX operations, check fax settings.
12	INVALID DCS	The parameter set to the remote transmitter does not correspond to our capabilities	Check SW settings, try to send to another machine.
13	IRRELEVANT RESPONSE	The called machine responded with a wrong frame (T30 violated)	Check SW settings, try to send to another machine.
15	INCOMPATIBLE REMOTE TRANSMITTER	It is no possible to find a common parameter set with the remote transmitter	The other machine can be uncompatible. Send to another machine. Control settings at remote machine. OK pressed instead of Start for TX.
22	INCOMPATIBLE REM. RECEIVER	Is not poosible to find a common parameter set with the remote RX	The other machine may be incompatible. Control code settings at both ends. Try to send to another machine.
23	SPEED MISMATCH	The remote transmitter returned in DCS a higher scan speed then the default DIS setting	The other machine may be uncompatible. Control code settings at both ends. Try to send to another machine.
26	NO POST MSG OR LOCAL INTERRUPT AT STATE F	Voice request was not acknowledged	The other machine may be incompatible. Check line connection Try to send to another machine. Exchange FCU -LIU
27	PHONE DISCONNECT	Connection terminated during voice request	Posibly the line was disconnected.
31	COVER OPEN DETECTED	The paper cover was opened.	Check cover. Check internal connections. Replace sensor. Replace FCU
33	COMMUNICATION TIME OUT	The receiver does not reply within the specified time.	The other machine may be incompatible. Check line connection Try to send to another machine. FCU -LIU. PBX settings.
34	REMOTE REJECTED	Unauthorized caller was rejected	Information only
38	NO LOOP CURR	No signal detection from Tel- line	Check line connection. LIU. FCU
40	PAPER OUT	No paper detected	Check paper , check or replace SPP paper sensor. Check internal connections. Replace FCU
41	DOCUMENT JAM	Document was longer than specified.	Check deatachable Scanner, Check scanner sensor, check int. connections. Replace FCU
45	PRINT OVERHEAT	Thermal Print Head overheat detected	Check FCU and Module. Replace.
46	BUSY DETECT	The tone detection detected a valid busy tone sequence and the vp_handlerissued an EV_disconnect event. Only valid if bitswitch 11/0 set	For PABX applications, check installation parameters. Check line connections.
55	FILM OUT	No Film detected	Check stripe position. Check ink sensor and FCU.
56	PAPER JAM_ DOCUMENT	Document too long. Document to thick.	Check sensor in the ADF.
57	MEMM FULL	Memory full detected.	Are there dokuments in memory? Is there any voice messages left ? Check Memory / Delete Memory
58	PAPER JAM	Paper is continuosly detected in the Pick Up Module	Check Pick Up rollers, paper sensor Replace FCU.
59	FAX ERROR	Internal error detected	Test machine functionality. Power Off/On
60	NO REMOTE VR	Signal VR - Voice Request no detected	The third party did not respond to the required signal. Test with another machine. Change FCU / LIU

9.3 ERROR MESSAGES

Error message	Reason	Action
NO DIALTONE	Machine can not detect the dialtone.	Try ONHOOK dialling to determine which dialtone can not be detected. Check PABX/PSTN setting.
NO LOOP CURRENT	No loop current detected.	Check line cable. Check LIU connectors.
NO CONNECTION	Other party is either busy or does not reply.	Check with manual dialling. PABX Parameters incorrect
REDIAL FAILED	No connection after 3 attempts.	Check with manual dialling. Try calling later.
TRANSMISSION ERROR	Too many errors during transmission.	Check the line connection. The other machine may be defect or incompatible, try sending to another machine. Adjust output level. Switch on echo cancelling.
OUT OF PAPER	Plain Paper wrong Loaded	Replace paper. Check sensor. Replace SPP sensor or FCU.
DOCUMENT JAM	Documents to thick, wide or.. Document longer than 60cm. Document stuck in ADF	Set the max Document length. Check SAF sensor.

9.4 TROUBLESHOOTING

The faxes are of poor quality		
Error	**Possible cause**	**Remedy**
You or your fax correspondent receive blank pages.	Your fax correspondent sends the wrong (blank) side of a document. The printer or scanner is faulty.	Your fax correspondent must feed the document properly. Test the fax machine by making a copy. If your copy is faultless the correspondent's fax machine might be defective. Call service if necessary.
Faxes are of poor quality.	The document contains photographs or small print. The document lacks contrast. Your fax machine is faulty.	Change the resolution setting to FINE or PHOTO. Check the document or set a higher contrast with function 47 (See chapter Scanner / Contrast). Test the fax machine by making a copy. If your copy is faultless the correspondent's fax machine might be defective. Call service if necessary.
Your fax or your recipient's fax machine produces black lines when printing.	There is paper in the sheet feeder. The scanner is dirty. Your fax machine is faulty.	Open the operation panel and remove the paper from the document feed slot. Clean the Scanner with a cloth(See Care and maintenance instructions). Test the fax machine by making a copy. If your copy is faultless the correspondent's fax machine might be defective. Call service if necessary.
Your fax machine produces white lines when receiving or copying.	thermal print head is dirty.	Copy a black page several times until the lines disappear.
You can not send faxes.	Scanner not put in.	Please put in scanner(see chapter Scanner).
The device dows not draw the document in during copying or sending.	Scanner has not clicked in.	Press both sides of the scanner down until you hear a definite click.

Problems when establishing a connection		
Error	**Possible cause**	**Remedy**
You cannot phone or send faxes.	You are operating your fax machine on a private branch exchange and have not set it accordingly.	In function 15, select PABX: Yes.
TRANSM. ERROR  Error report	The telephone connection is of poor quality. The recipient has a paper jam or has run out of paper.	Try again or send the fax at reduced speed (function 21). Call your fax partner or try to transmit at a later stage.
NO CONNECTION or REDIAL FAILED	Your fax partner's line is busy, does not answer or a different device like an answering device answers.	Try later or draw your fax partner's attention to a possible installation fault.
NO LOOP CURRENT	Improper installation or plug-in of fax machine.	Check the installation of your fax machine.
NO DIALTONE	You are connected to a PABX system. You have connected your telephone cable to the socket identified with EXT.	Check the settings in function 15. Connect your telephone cable to the socket on the bottom of your fax machine identified with LINE.
When you lift the receiver of your fax machine you do not hear the dial tone.	You have connected the telephone cable to the socket marked with EXT.	Plug the telephone cable into the socket marked with LINE on the base of the fax machine.
BUSY or fax transmissions are constantly interrupted.	Your fax correspondent has a fax machine that cannot receive the usual standard identifying signals.	Try to send the fax manually: press **DIAL/**🕪 and dial the fax number. You will hear the call being established. If the recipient is using an automatic answering device, wait until you hear a tone after the prerecorded message. Press **START**.
You cannot receive any faxes.	You have set the number of rings too high for the answering machine or the total number of ringing signals for a device without answering machine. For many fax machines, the call establishment procedure is too long, and transmission is interrupted.	Set the number of ringing signals for the answering machine or the total number of ringing signals with function 31 or 32 to lower than five.
NO CONNECTION	You no longer have a valid Internet connection, but the device still attempts to transmit international faxes via the Internet.	Switch the automatic fax despatch via the Internet off, using function 29.

Other		
Errors	**Possible cause**	**Remedy**
Copy is blank.	Document loaded the wrong way up. Printer or scanner faulty.	Load the document with the printed side up. Service.
On lifting the handset you hear a tone or silence.	The caller is trying to send a fax.	On the fax machine: press START. On the additional phone: press ⊛ and ⑤. Then replace the handset.
On lifting the handset of an additional telephone you hear in the background the ringing tone or, depending on the device type, the activated outgoing message of your own built-in answering machine.	Your additional telephone is connected in parallel.	Press ⊛ twice to switch off the ringing tone or the outgoing message. You can now make a call without interferences (see chapter Fax switch).
Received documents do not appear as normal at the front of the fax machine.	Paper jam.	Open the operation panel and ink film cover. Leave the paper refill flap closed. Pull the crumpled paper out carefully from inside.
Only for fax machines with built-in answering device: You have switched on your answering machine and cannot receive any faxes.	You use background music. Your outgoing message is too long.	Record a message without music. Record a shorter announcement (no longer than 20 seconds).
PAPER JAM	One sheet or more sheets of paper were not drawn in straight. To many sheets inserted (more than 50 sheets).	Open the operation panel and the ink film cover and pull the paper carefully outwards from the inside.
DOCUMENT JAM	One document was not drawn in straight or more documents were both drawn in at the same time.	Remove the Scanner and pull the paper carefully outwards in one direction.
EXTERNAL PHONE	You are now using an additional telephone.	This is not a fault!
INKFILM LOW	Your ink film is nearly used up.	Get a new inkfilm.
PLS SETUP FIRST	You did not set-up your Internet account.	In order to use e-mail functions your Internet account must be set-up correctly (function 17).
Even though you interrupt e-mail reception, you still receive unwanted e-mails.	no error	All incomplete e-mail transmissions are stored by your server until e-mail transmission has been successful or 7 attempts to deliver have been made.
Faxes sent by you as e-mail cannot be opened at the computer.	Computererror.	Check whether your recipient has installed the respective standard software in the computer.
Despite your Internet access having been set up, your PABX cannot obtain a server connection.	PABX incorrectly set up.	The PABX must be set up again by the manufacturer.

10 TECHNICAL SPECIFICATIONS

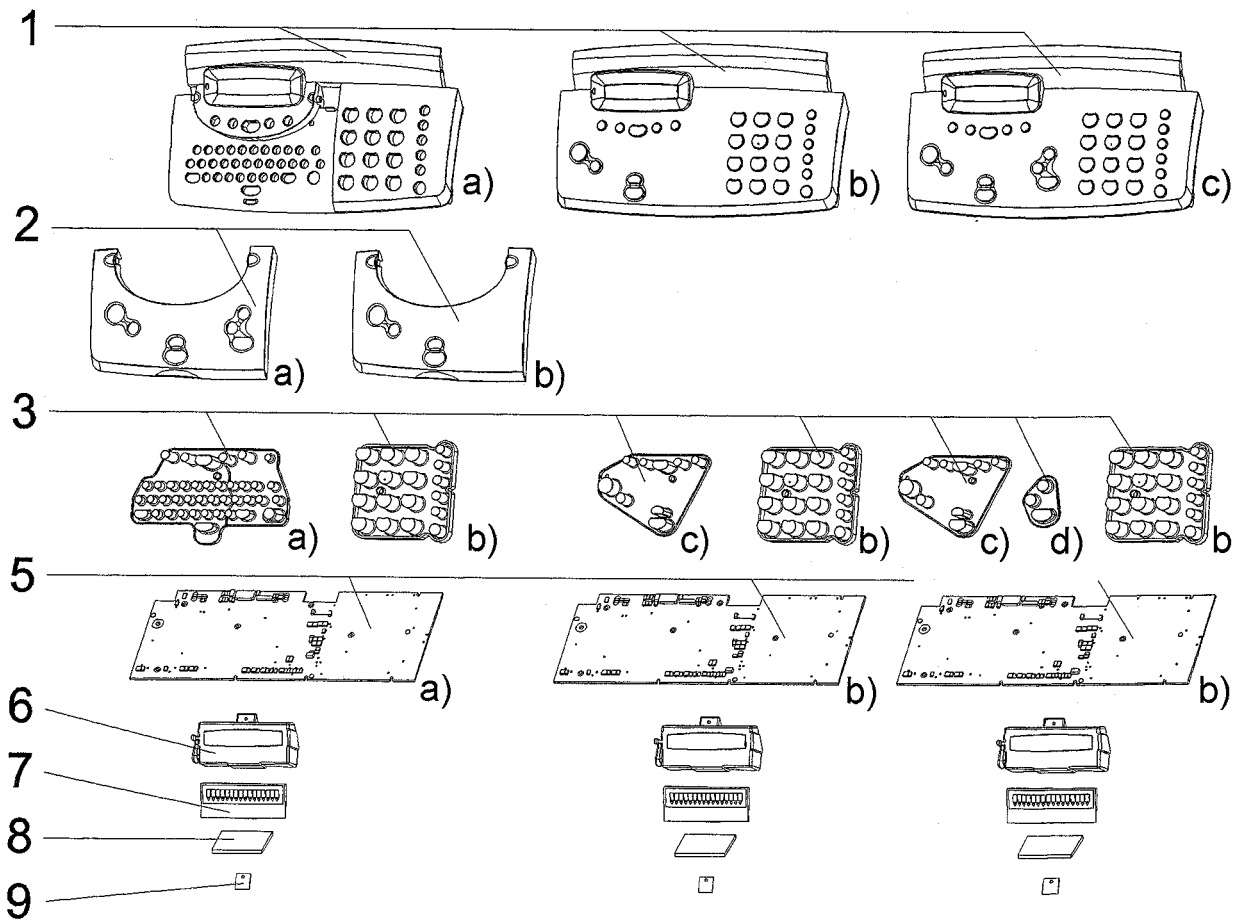
10.1 SPECIFICATION

Compatibility		ITU Group 3
Type of connection		outside line (PSTN) / extension (PABX)
Flash times		Singapore: outside line (PSTN): 600 ms extension (PABX): 600 ms other countries: outside line (PSTN): 100 ms extension (PABX): 100 ms
Size of document	width:	single sheet 148 - 217 mm several sheets 148 - 217 mm
	length:	single sheet 100 - 600 mm several sheets 148 - 297 mm
	thickness:	single sheet 0.05 - 0.2 mm several sheets 0.07 - 0.15 mm
Printing paper		A4 210 x 297 mm, 80 g/m2
Largest scanning width		216±1 mm
Resolution		horizontal: 8 points/mm (200 dpi) vertical: standard 3.85 lines/mm fine 7.7 lines/mm
Photo mode		16 grey tones (fax machine without integrated answering device) 64 grey tones (fax machine with integrated answering device)
Contrast control		automatic and manual
Copying		fine and photo resolution
Data compression		MH, MR
Modulation		V29bis, V27ter, V21, V17
Transmission speeds		9600/7200/4800/2400 bps
Sound power level		stand by mode: <30 dBA copy mode: <53 dBA
Printing method		ink film printer
Fax paper		standard A4 letter 210 x 297 mm (document)
Document feed		up to 10 letters (80 g/m²)
Fax switch		DAY/NIGHT/TIMER
Dimensions		356 x 240 x 163 mm (without paper tray)
Weight		about 3 kg
Power consumption		stand by: about 1 W telephoning: about 5 W sending a standard letter: ca. 20 W receiving a standard letter: ca. 35 W
Power supply		220-240 V / 50-60 Hz
Speech recording time		up to 30 minutes
Speech output		yes
Allowed operating environment		temperature: 5 - 40 °C relative humidity: 15 - 85 % RH not condensing
Recommended operating environment in use:		temperature: 17 - 28 °C relative humidity: 20 - 80 % RH not condensing
Recommended operating environment in unplugged status (ready for operation with loaded ink film and paper):		temperature: 0 - 45 ° C relative humidity: 15 - 85 % RH not condensing
Interference suppression:		with EN 55022 / VDE 0878 part 1 class B

IV Spare parts

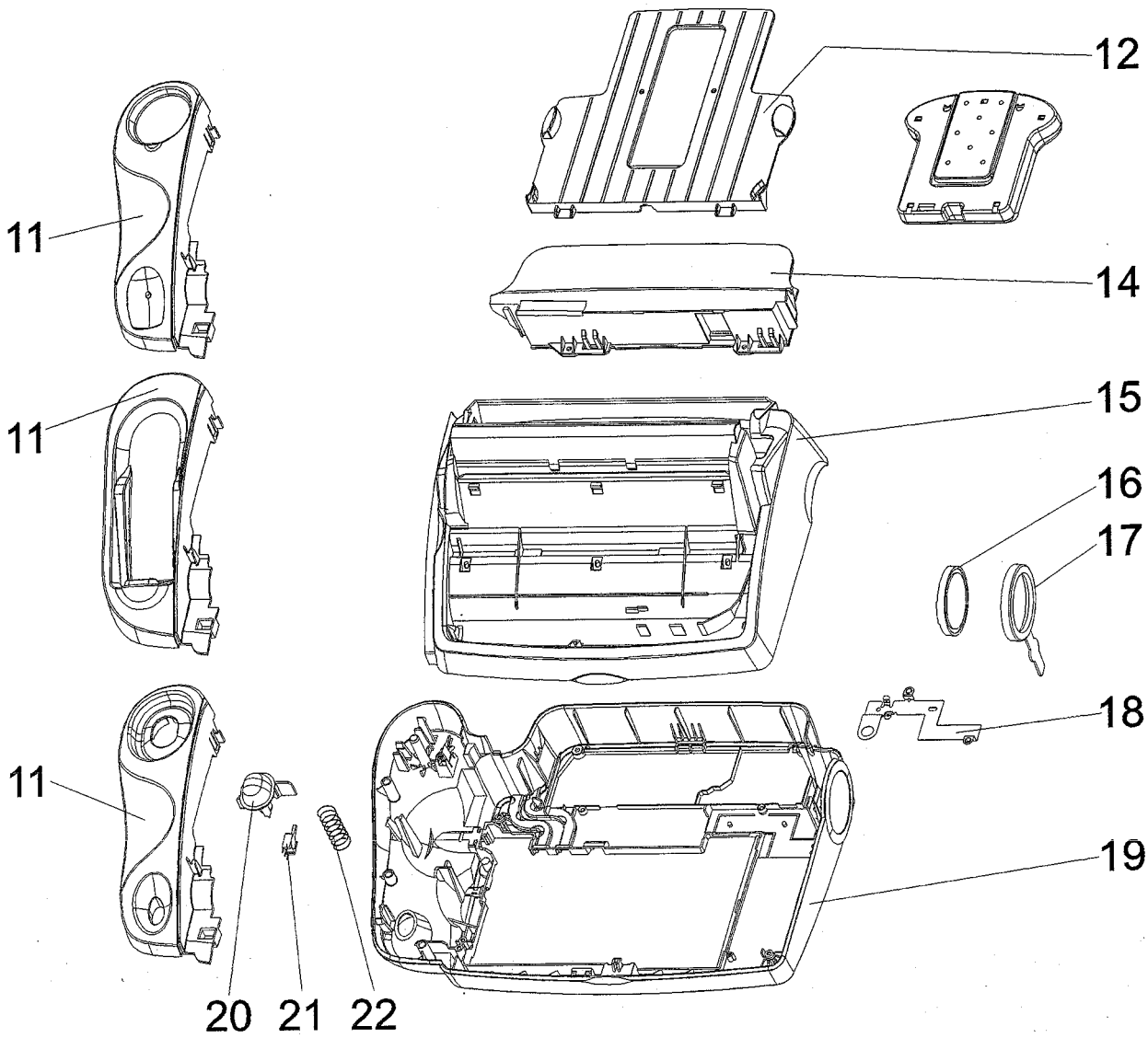
exploded view

Panels



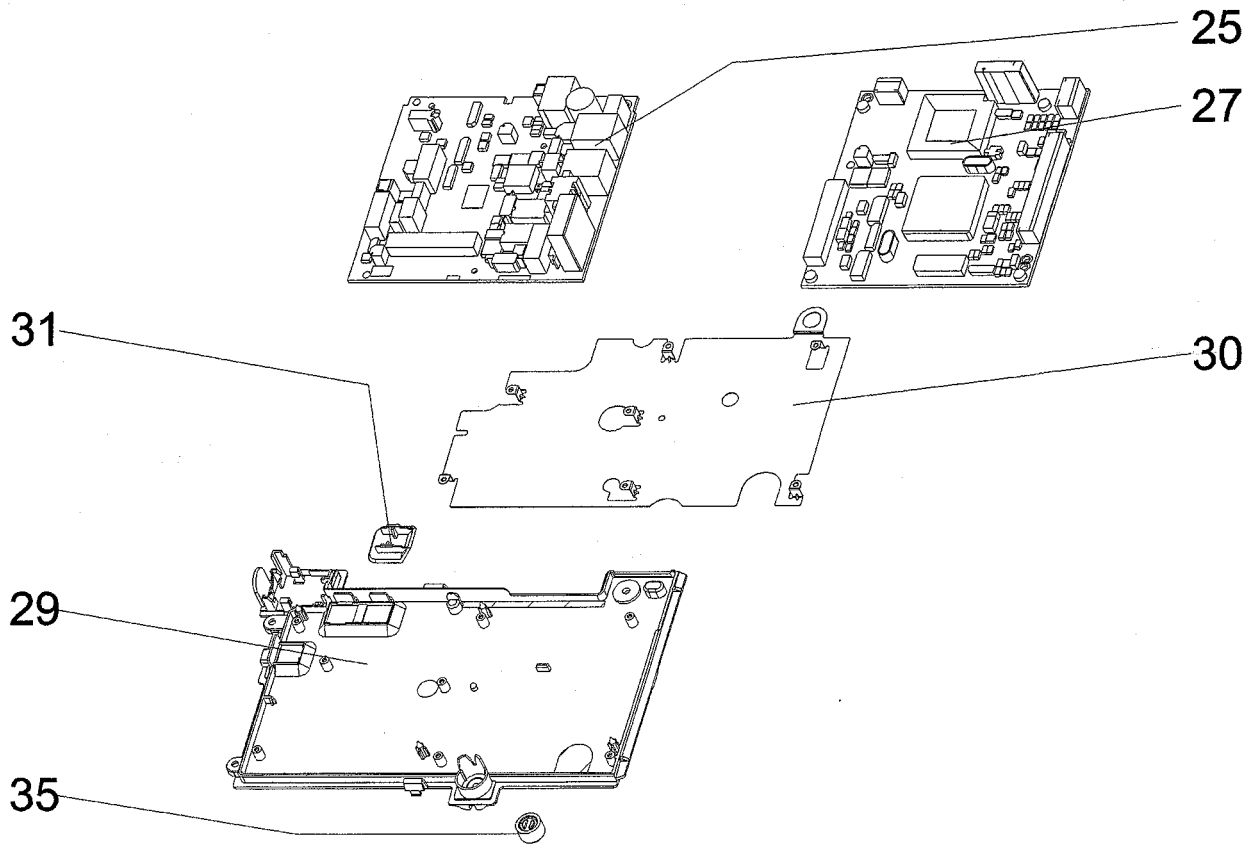
Pos.	Description	Remark	Codenumber
1a	Front panel, printed	PPF 456 - UK	5103 507 63890
1a	Front panel, printed	PPF 456 - FR	5103 507 64030
1a	Front panel, printed	PPF 476/471 - UK	5103 507 63900
1a	Front panel, printed	PPF 476 - FR	5103 507 64040
1a	Front panel, printed	PPF 486 - UK	5103 507 64140
1a	Front panel, printed	PPF 486 - FR	5103 507 64190
1b	Front panel, printed	PPF 441 - UK	5103 507 64130
1b	Front panel, printed	PPF 441 - FR	5103 507 64180
2a	Panel flap, complete	PPF 476,486 - UK	5103 509 43690
2a	Panel flap, complete	PPF 476,486 - FR	5103 509 43700
2a	Panel flap, complete	PPF 471 - UK	5103 509 43760
2b	Panel flap, complete	PPF 456 - UK	5103 509 43670
2b	Panel flap, complete	PPF 456 - FR	5103 509 43680
3a	Rubbermat - function	PPF 456,476,486 - UK	5103 507 64010
3a	Rubbermat - function	PPF 456,476,486 - FR	5103 507 64070
3b	Rubbermat - numeric		5103 504 41710
3c	Rubbermat - function	PPF 441	5103 504 41760
3d	Rubbermat - TAM		*follow a.s.a.p*
5a	$PCB OPU email	PPF 456,476,486	5103 508 13660
5b	$PCB OPU standard	PPF 441	5103 508 13670
6	LCD window		5103 504 20580
7	LCD standard		5103 508 80740
8	LCD foamrubber		5103 504 41680
9	LCD holder		5103 504 21010

Housing



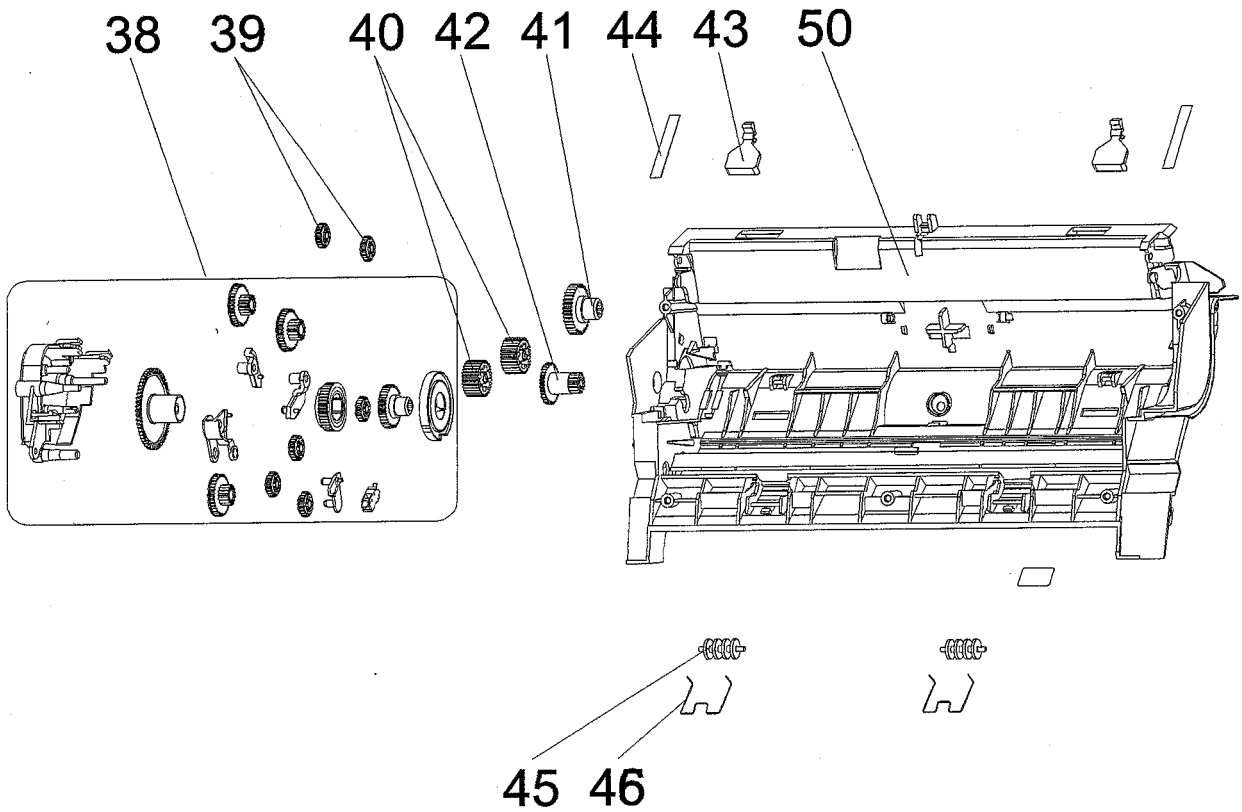
Pos.	Description	Remark	Codenumber
11	Handset cover, standard	PPF 441,456,471,476	5103 504 20490
11	Handset cover, dect	PPF 486	5103 507 64160
11	Handset cover, pots		5103 504 21040
12	Papertray		5103 504 20440
14	PGU 220-240V		5103 509 24620
14	PGU 110-130V		5103 509 24630
15	Toppart		5103 504 20470
16	Loudspeaker ring		5103 504 41780
17	Loudspeaker		5103 508 80600
18	Ground connector		5103 501 42390
19	Bottom		5103 507 63960
20	Hookswitch knob		5103 504 20510
21	Hookswitch		5103 508 80640
22	Hookswitch spring		5103 501 01390

Prints and Printholder



Pos.	Description	Remark	Codenumber
25	PCB LIU	for DE(/02) and AT(/09)	5103 508 13810
25	PCB LIU - DECT	for DE(/02) and AT(/09)	5103 508 13910
25	PCB LIU	for FR(/19) and GB(/05)	5103 508 13820
25	PCB LIU - DECT	for FR(/19) and GB(/05)	5103 508 13920
25	PCB LIU	for IT(/08)	5103 508 13830
25	PCB LIU - DECT	for IT(/08)	5103 508 13930
25	PCB LIU	for CH(/06)	5103 508 13840
25	PCB LIU - DECT	for CH(/06)	5103 508 13940
25	PCB LIU	for rest of europe	5103 508 13850
25	PCB LIU - DECT	for rest of europe	5103 508 13950
25	PCB LIU	for east europe (/00 and /36)	5103 508 13880
27	PCB FCU 1	PPF 441, 456	5103 508 13610
27	PCB FCU 2	PPF 476, 486	5103 508 13620
29	Printholder		5103 504 20460
30	Ground shielding		5103 501 42480
31	Line cover	for AT and FR	5103 504 19750
35	Microphone, assy	PPF 486	5103 507 83820

Mech. Module - Part 1

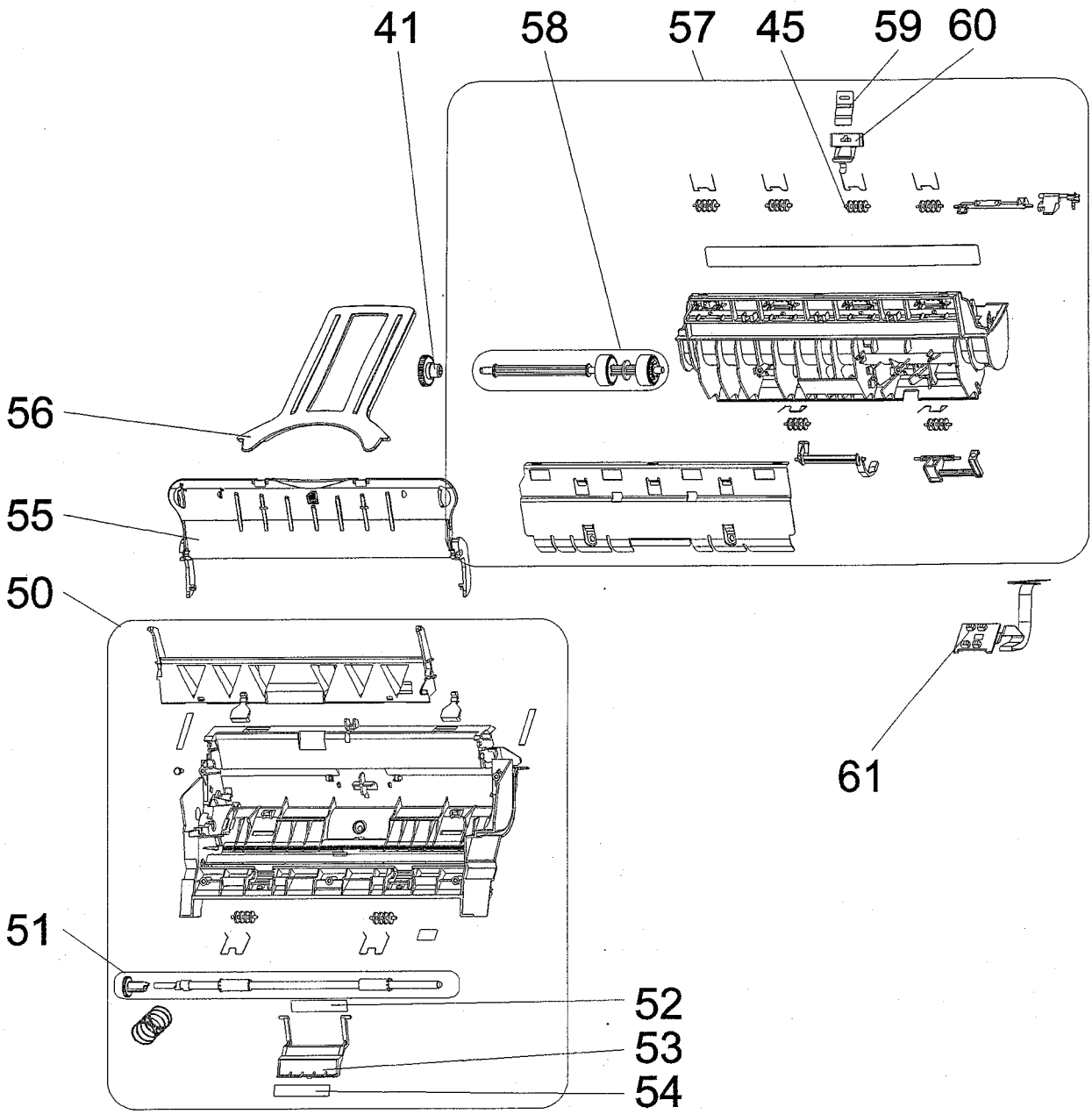


Pos.	Description	Remark	Codenumber
38	Gearbox		5103 509 43620
39	Twist gear 1		5103 504 01580
40	Pick-Up gear 1		5103 504 01600
41	Pick-Up gear 2		5103 504 01610
42	Scan gear		5103 504 01620
43	Paper back lever		5103 504 20670
44	Spring foil retardation		5103 501 01350
45	Support roller		5103 504 01470
46	Spring PUP support		5103 501 01360

Cables

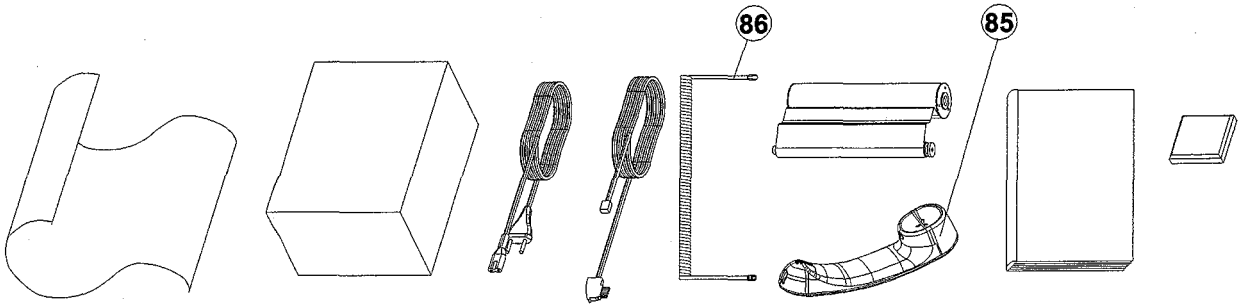
Pos.	Description		Remark	Codenumber
	CABLE - 9P	(ECB-TPH B)	Number: #06	5103 507 83670
	CABLE - 10/9P	(ECB-TPH A)	Number: #09	5103 507 83680
	CABLE - 8P	(OPU-FCU)	Number: #03 (FCC)	5103 507 83740
	Silicon-Tube		for Cable OPU-FCU	5103 504 41810
	CABLE - 35P	(ECB-FCU)	Number: #10 (FCC)	5103 507 83750
	CABLE - 27P	(FCU-LIU)	Number: #4	5103 508 79130
	Groundcable		Number: #8	5103 507 83840
	CABLE - 2P	(FCU - Contacts)	PPF 486	5103 507 83800
	CABLE - 2P	(DC/DC-BASE)	PPF 486	5103 507 83790
	CABLE - 4P	(FB - LIU)	PPF 486	5103 507 83810

Mech. Module - Part 2



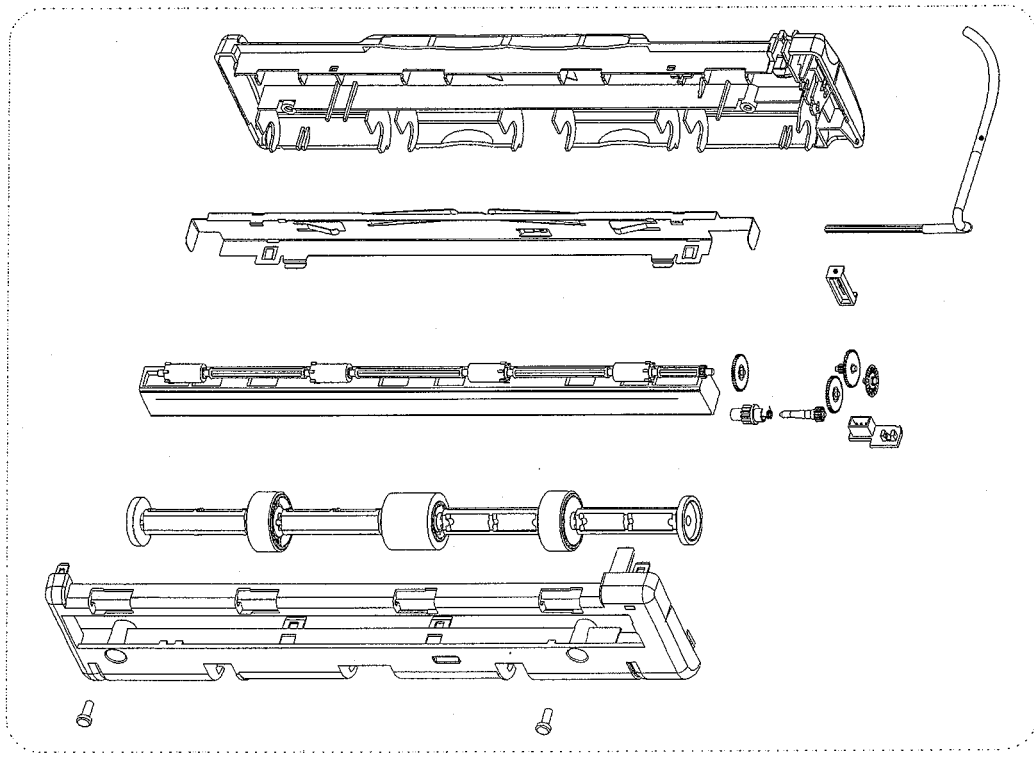
Pos.	Description	Remark	Codenumber
50	Pick-Up Module		5103 509 43640
51	... Ejector Roller		5103 509 43660
52	... Friction plate		5103 504 20770
53	... Retard pad		5103 503 20110
54	... Friction pad AFS		5103 504 41820
55	Release flap		5103 504 20730
56	Release flap extension		5103 504 21180
57	Scanner Module		5103 509 43630
58	... Transport Roller		5103 509 43650
59	... ADF spring prism		5103 501 42450
60	... ADF lip		5103 504 41700
61	PCB SGS (Multi-Sensor-Board)		5103 508 13640

Accesories

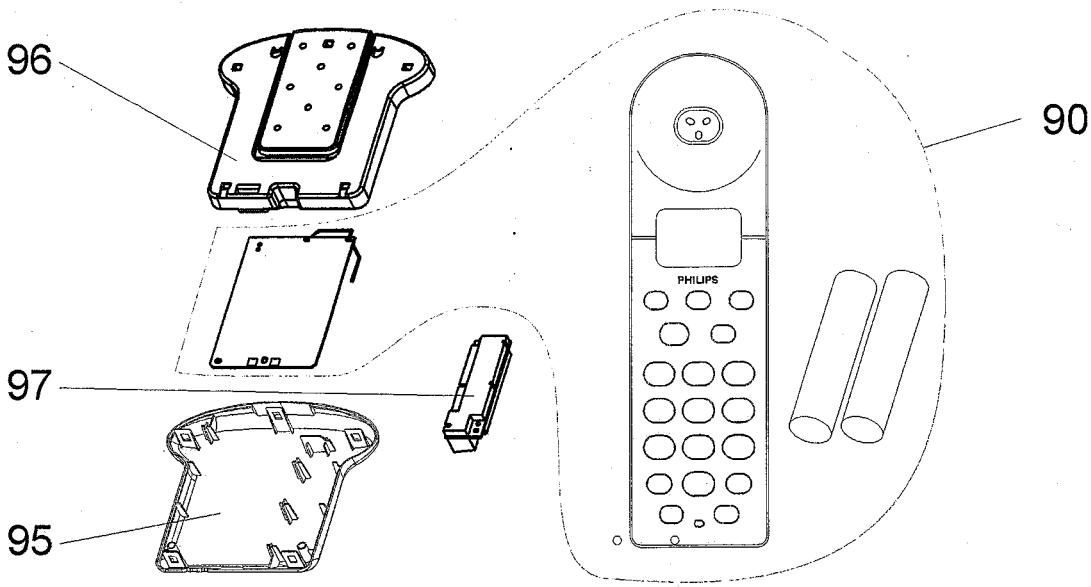


Pos.	Description	Remark	Codenumber
85	Handset		5103 508 80590
85	Handset - Pots	for CN	*follow a.s.a.p.*
86	Handset cord		5103 508 79580
	Power cord	EURO	5103 508 79370
	Power cord	US	5103 508 79850
	Power cord	CN	5103 508 80210
	Telephone cord	for D	5103 507 83060
	Telephone cord	for NL	5103 507 82700
	Telephone cord	for N	5103 507 83260
	Telephone cord	for UK	5103 507 82080
	Telephone cord	for PPF486/UK	5103 507 82950
	Telephone cord	for I	5103 507 83550
	Telephone cord	for CH	5103 507 83620
	Telephone cord	for A	5103 507 83090
	Telephone cord	for INT,S'pore,(B),.....	5103 507 82280
	Telephone cord	for IRE,P,E	5103 508 73740
	Telephone cord	for F	5103 507 82570
	Telephone cord	for PPF486/FR	5103 507 82820
	Telephone cord	for S	5103 507 82710
	Telephone cord	for SF	5103 507 82310
	Telephone cord	for Dk	5103 507 82320
	Telephone plug	for B	5103 508 73370
	Telephone adapter cable	for D	5103 508 79400
	Telephone adapter cable	for N	5103 507 82280
	Telephone adapter cable	for CH	5103 507 83520
	Telephone adapter cable	for I	5103 507 83540
	User manual	PPF 456/476-D,A,CH	5103 506 17090
	User manual	PPF 456/476-UK,INT	5103 506 17120
	User manual	PPF 456/476-I	5103 506 17130
	User manual	PPF 456/476-F,B,CH	5103 506 17140
	User manual	PPF 456/476-NL,B	5103 506 17150
	User manual	PPF 456/476-E,INT	5103 506 17160
	User manual	PPF 456/476-S	5103 506 17170
	User manual	PPF441-D,A,CH	5103 506 17190
	User manual	PPF441-UK,INT	5103 506 17210
	User manual	PPF441-IT	5103 506 17220
	User manual	PPF441-F,B,CH	5103 506 17230
	User manual	PPF441-NL	5103 506 17240
	User manual	PPF441-E	5103 506 17250
	User manual	PPF441-S	5103 506 17260
	User manual	PPF441-CZ	5103 506 17360
	User manual	PPF486-D,A,CH	5103 506 17200
	User manual	PPF486-UK	5103 506 17270
	User manual	PPF486-I	5103 506 17280
	User manual	PPF486-F	5103 506 17290
	User manual	PPF471-UK,INT	5103 506 17340
	User manual	PPF471-CZ	5103 506 17350

Handscanner and Dect-Modules

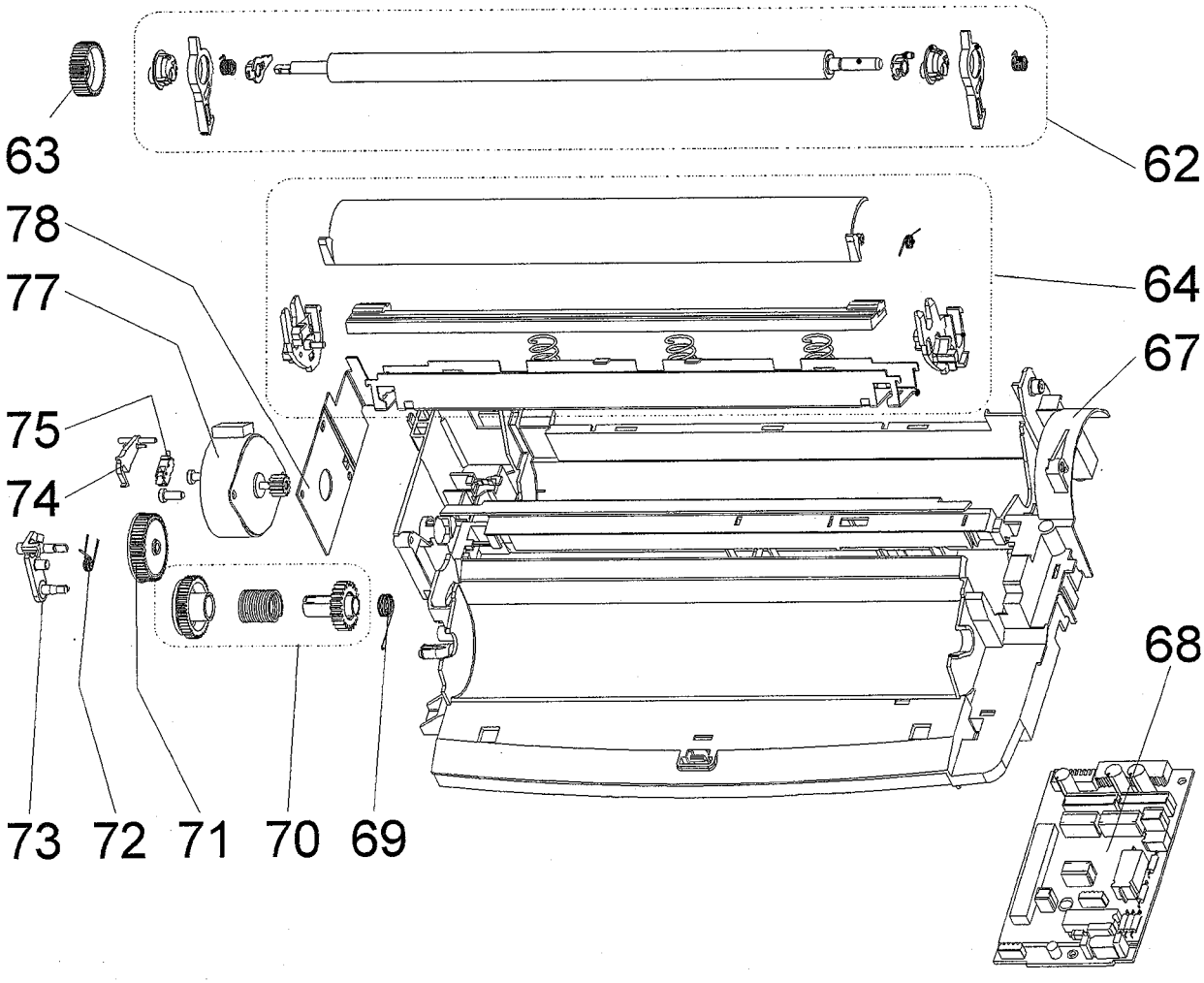


Pos.	Description	Remark	Codenumber
80	Handscanner	detachable for PPF 456,476,486	5103 509 43720
	Scanner	fix for PPF 441	5103 509 43730



Pos.	Description	Remark	Codenumber
90	Cordless set KALA	for PPF486/02	5103 509 24660
90	Cordless set KALA	for PPF486/05	5103 509 24670
90	Cordless set KALA	for PPF486/08	5103 509 24680
90	Cordless set KALA	for PPF486/19	5103 509 24690
95	Dect-Box bottom	for PPF486	5103 504 21030
96	Dect-Box toppart	for PPF486	5103 504 21020
97	DC/DC Converter	for PPF486	5103 508 80860

Mech. Module - Part 3



Pos.	Description	Remark	Codenumber
62	Printerroller		5103 509 43610
63	Gear Printerroller		5103 504 01450
64	Printerhead, complete	incl. Cables	5103 509 43710
67	Printerchassis		5103 504 20850
68	PCB ECB		5103 508 13590
69	Lock spring		5103 501 01410
70	Slipclutch, assy		5103 507 63990
71	Gear Slipclutch		5103 504 01630
72	Spring swivel lever		5103 501 42420
73	Lever Swivel		5103 504 20890
74	Lever SGP		5103 504 20740
75	Switch SGP with cable		5103 508 80610
77	Steppermotor		5103 508 80400
78	Cooling plate		5103 501 70150

Packaging

Pos.	Description	Remark	Codenumber
	Service A-Box		5103 506 71770
	Inkfilm	ONLY FOR SERVICE !!!!!!	5103 509 24640
	IC OPT, empty		5103 509 23650
	A-Box, printed	PPF 441	5103 506 71750
	A-Box, printed	PPF 456	5103 506 71520
	A-Box, printed	PPF 471	5103 507 71690
	A-Box, printed	PPF 476	5103 506 71700
	A-Box, printed	PPF 486	5103 506 71760
	Moulded Fibre	PPF 441 - 476	5103 506 62180
	Moulded Fibre	PPF 486	5103 506 62240
	Dect-Inlay	PPF 486	5103 506 62280
	Tape	for fix closing Toppart with bottom	5103 509 24650

Firmware

For codenumber of the firmware see table downstairs. The codenumber of the software is 5103 509 xxxxx.

For xxxxx see:

	PPF 441	PPF 456	PPF 471	PPF 476	PPF 486
/00	33210	32950	33190	32960	
/02	33070	32710		32750	33030
/03	33080	32790		32840	
/04		33010		33020	
/05	33090	32720		32760	33040
/06	33100	32800		32850	
/07					
/08	33110	32730		32770	33050
/09	33120	32810		32860	
/10	33130	32820		32870	
/13	33140	32890		32900	
/14		32970		32980	
/15		32930		32940	
/16	33150	32830		32880	
/17		32910		32920	
/19	33160	32740		32780	33060
/20		32990		33000	
/30					
/31					
/36	33220		33200		
/58					
/78		33170		33180	
/86					
/91					

date: 1-4-2000

12 GLOSSAR

ABC	Automatic Background Control
ACK	Acknowledge
ADF	Auto Document Feeder
AM	Amplitude Modulation
AVM	Auto Voice Message
ASIC	American Standard Interchange Communication
bps	bits per second
BSW	Bitswitch
BT	British Telecom
BUZCLK	Buzzer Clock
BUZON	Buzzer On
CCD	Charge Coupled Device
CE	Consumer Electronic
CED	Called
CFR	Confirmation to Receive
CIS	Contact Image Sensor
CLK	Clock
CNG	Calling
CRP	Command Repeat
CODEC	Coder/Decoder
CPU	Central Processing Unit
CSI	Called Subscriber Identification
DCN	Disconnect
DCS	Digital Command Signal
DEC	Decimal
DIS	Digital Identification Signal
DTMF	Dual Tone Multiple Frequency
EOM	End Of Message
EOP	End Of Procedure
EPROM	Erasable Programmable ROM
ESD	Electrostatic Discharge
FAX	Facsimile
FBP	Feature Box Power
FCB	Fax Control Board
FCC	Flex Coiled Cable
FCF	Fax Control Field
FCU	Fax Control Unit
FM	Frequency Modulation
FOSCI	Fast Oscillator Input
FSK	Frequency Shift Keying
FTT	Failure To Train
HDLC	High Level Data Link Control
HEX	Hexadezimal
HSB	Hook Switch Subboard
HW	Hardware
ICM	Incoming Message
ICR	Incoming Ring
ILED	Input LED
IRB	Infrared Board
ITU	International Telecommunication Union (former CCITT)
LCD	Liquid Crystal Display
LIU	Line Interface Unit
LCD	Liquid Crystal Display
LPF	Low Paß Filter
LS	Loudspeaker
MCF	Message Confirmation
MCL	Mercury Communications Limited
MHC	Modified Huffman Code
MICEN	Microphone Enable
modem	Modulator/Demodulator
MPS	Multi Page Signal
MRC	Modified Read Code
MRXD	Receive Data
MTXD	Transmit Data
NAK	Not Acknowledge
NCU	Network Control Unit
NDB	Noise Detection Board
NSF	Non Standard Facilities
NSS	Non Standard Facilities Set-up
OGM	Outgoing Message
OPU	Operation Panel Unit
OTPROM	One Time Programmable ROM
P	Page
PABX	Private Automatic Branch Exchange
PCB	Printed Circuit Board
PFAIL	Power Fail
PGU	Power Generation Unit
PIN	Procedure Interrupt Negative
PIP	Procedure Interrupt Positive
PM	Phase Modulation
POTS	Power Off Telephone System
ppm	parts per million
PPM	Plain Paper Motor
PSAVE	Power Save
PWM	Pulse Width Modulation
QAM	Quadrature Amplitude Modulation
RB	Ring Back
RC	Resistor Capacitor
READ	Relative Element Address Designate
ROM	Read Only Memory
RTI	Remote Terminal Identification
RTN	Retrain Negative
RTP	Retrain Positive
RX	Receive
SBG	Signal Background control
SCO	Sensor Cover Open
SDI	Sensor Document In
SDIN	Sigma Delta in
SDOUT	Sigma Delta Out
SGP	Sensor Gear Position
SHC	Sensor Hook Cradle
SIF	Sensor Ink Film
SMPS	Switched Mode Power Supply
SOP	Sensor Out of Paper
SOSCI	Slow Oscillator Output
SSB	Sensor Board
SPP	Sensor Paper Stock and Paper in
SPR	Sub Print Ringer
STM	Stepper Motor
SVI	Signal Video In
SW	Software
S&H	Sample and Hold
TCF	Training Check Field
TM2	Thermistor
TPH	Thermal Printer Head
TPHON	Thermal Head On
TSI	Transmitting Subscriber Identification
TTI	Transmit Terminal Identification
TX	Transmit
VIN	Video In

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